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Vol. XIX | OCTOBER 9, 1929 | No. 1

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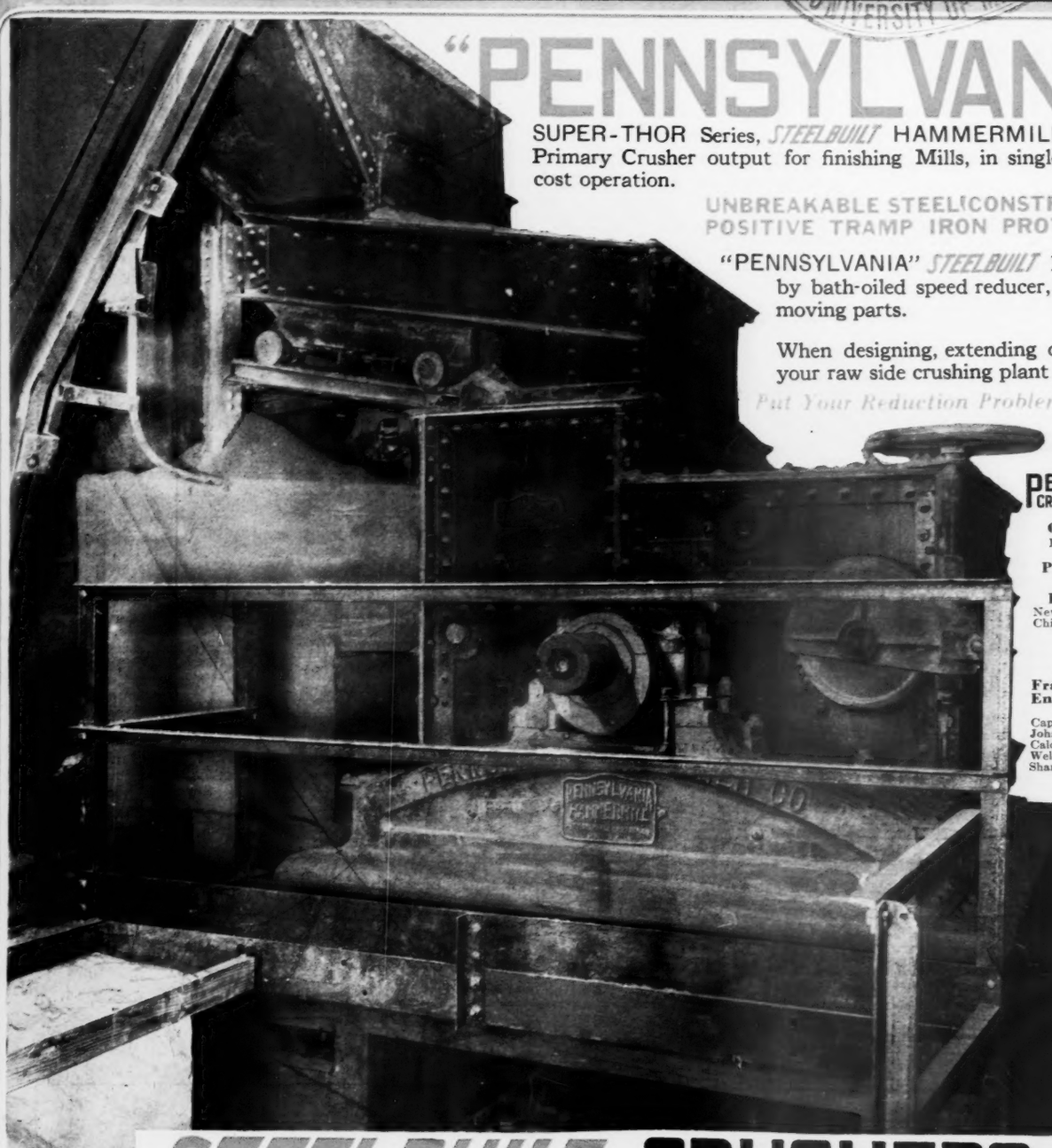

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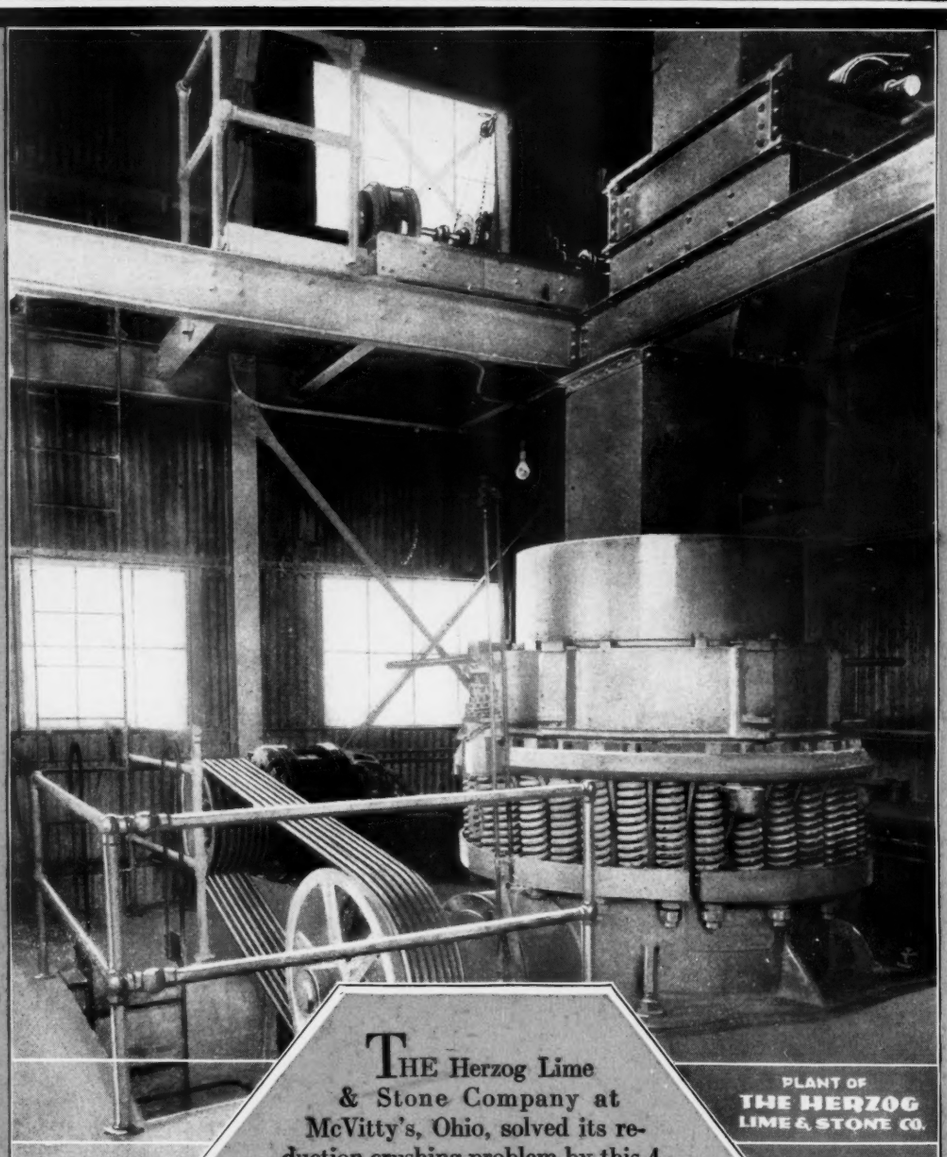

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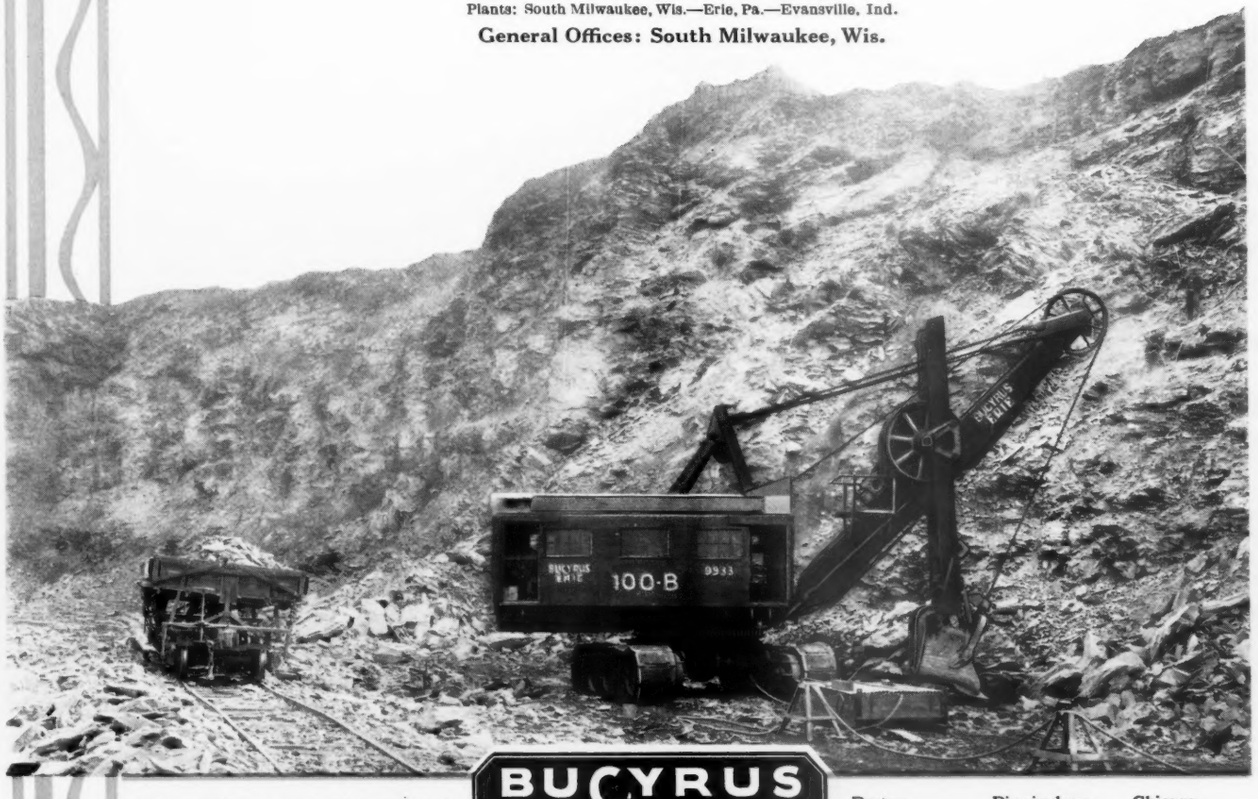

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ARTHUR J. HOSKIN, *Editor* — S. A. PHILLIPS, *Assistant Editor*

J. O. DURKEE, *Assistant Editor* — G. B. MASSEY, *Associate Editor*

W. E. TRAUFFER, *Assistant Editor* — G. F. SONDRAKER, *Associate Editor*

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Vol. XIX — CHICAGO, OCTOBER 9, 1929 — No. 1

FEATURE CONTENTS

Cap-Rock of Louisiana Salt Dome Constitutes Basis on Quarry Operations.....37

What Screen Shall I Use for Handling My Crushed Stone? 43

Recently Enlarged Plant of Sowerbutt Quarries Simple but Highly Efficient..47

These Quarries and Plants Near Columbus, Ohio, Produce Various Limestone Grades 52

Latest Ideas Are Incorporated in Stone-Crushing Plant at Harrisburg, Pa.....57

Diesel Engines—Their Present and Possible Applications in the Pit and Quarry Industries 60

(Second Installment)

The Executive and Safety 77

Safe Practices in the Quarry.....79

Putting Punch into a Safety Campaign.....81

Natural Features Combine to Enhance Commercial Worth of This Basalt Ledge 85

Belgian Cement Industry Protests American Tariff 92

Commercial Aggregate and Road Ballast Are Produced in This Simple Well-Equipped Plant 93

National Safety Council Holds Highly Successful Annual Congress in Chicago.97

Construction Aggregate Prepared from Basalt Excavated in Providing Approach to Bridge 100

The Executive's View of Waste.....101

Pacific Northwest Cement Manufacturers Celebrate Trophy Award to Oregon Company 103

Men of the Industry.....105

Personal Mention 106

Financial News Corporate and Business...107

Legal Information for Operators.....109

Traffic News and Comment.....111

Review of Foreign Practice.....112

Latest News Flashes.....113

New Machinery and Supplies.....115

Next Issue October 23, 1929

Pit and Quarry
With which is consolidated
CEMENT-MILL & QUARRY

Vol. XIX CHICAGO, OCTOBER 9, 1929 No. 1

Cap-Rock of Louisiana Salt Dome Constitutes Basis for Quarry Operation

Southern Mineral Company Produces Grades of Washed Calcite

By T. K. KNOX

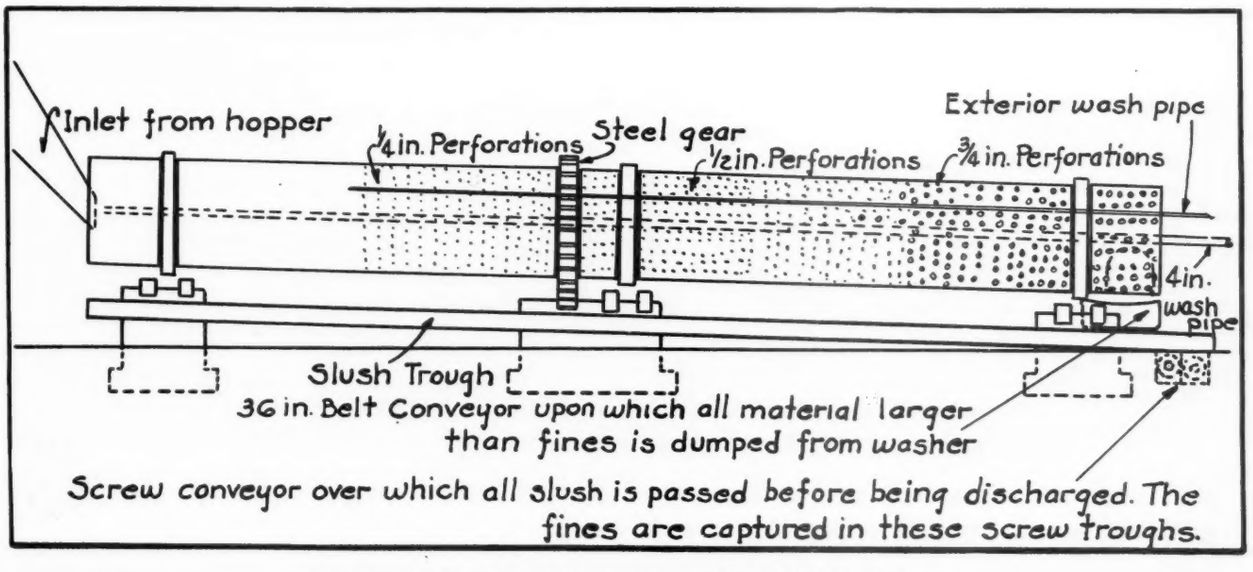
THE Southern Mineral Company's crushing plant and rock quarry are located about five miles west of the town of Winnfield, Louisiana. The quarry is extremely interesting, and has many problems peculiar unto itself, because the quarry is the cap-rock of a salt dome. Standard procedure, in many instances, cannot be followed and original methods had to be worked out. A clearer conception of the individual problems of this plant and quarry, can be had by reviewing the physical, chemical, and structural construction of a salt dome.

Salt Domes

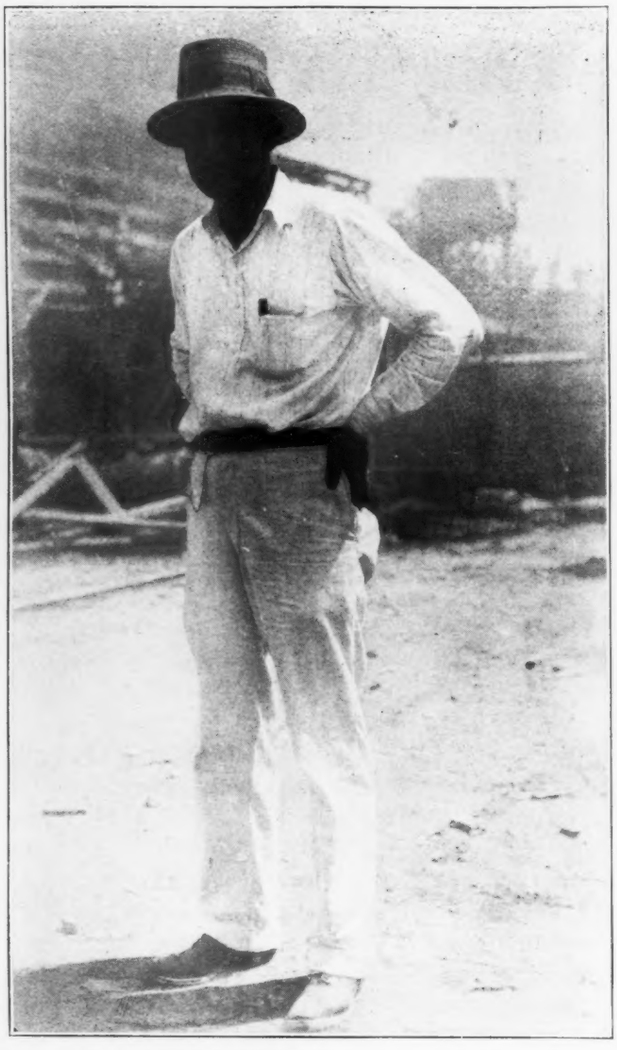
A salt dome is an uplift in which the beds or strata dip outward in all directions from a center. Generally these up-swellings of the earth's surface is found on the coastal and interior flats of Louisiana and Texas. They are one-fourth mile to one mile in diameter and generally have a depression at the summit, which slopes from the periphery of the dome to the center. These domes are formed probably by the strata being lifted upward by increase in volume or crystallization of the salt and also by anhydrite changing to gypsum.

The salt core of these domes pierces many hundreds of feet of strata. The origin of the salt core is unknown. Wells have been drilled 2,000 feet in salt and stopped in salt. As found by drilling, the usual rocks overlying a salt core are limestone, gypsum, and anhydrite. The anhydrite is generally directly over the salt mass. This combination of strata is known as the cap rock of the salt dome. Sulphur occurs on many of the domes, generally on the flanks of the dome, in the cap rock just above the anhydrite. Oil is found on salt domes also, both in the cap rock and in the strata surrounding the dome.

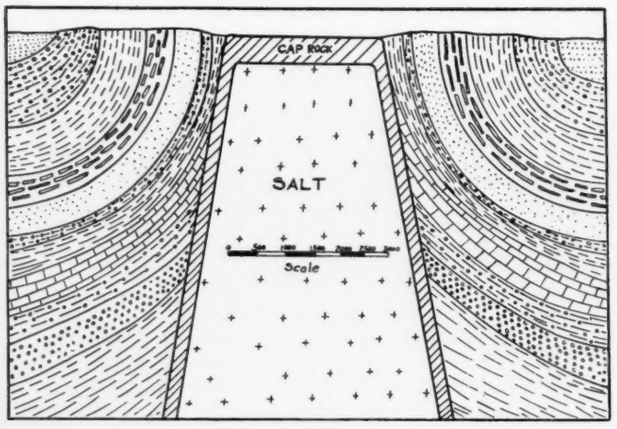
Characteristic salt dome topography is steeply


Inlet from hopper
¼ in. Perforations
Steel gear
½ in. Perforations
¾ in. Perforations
Exterior wash pipe
4 in. wash pipe
Slush Trough
36 in. Belt Conveyor upon which all material larger than fines is dumped from washer
Screw conveyor over which all slush is passed before being discharged. The fines are captured in these screw troughs.

Elevation sketch of washing screen, Southern Mineral Company



J. M. Jenkins, superintendent

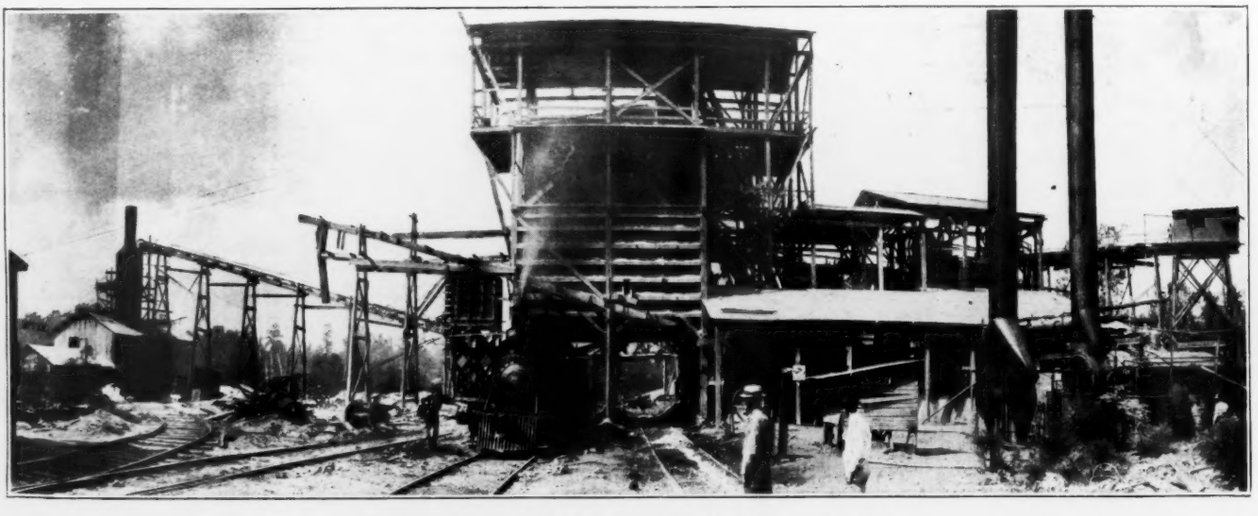


Idealized cross-section of the salt dome of Southern Mineral Company

dipping beds with outcrops of older formations than are found generally in the immediate area. The surface manifestations of salt domes are the results of truncations of highly localized structures of great relief. Truncations may be assisted in some places, where the salt mass lies close to the surface, by the removal of salt in solution, thus producing the peculiar topographic form of a central basin area encircled by hills.

The quarry of the Southern Mineral Company is the cap-rock of the Winnfield salt dome, which is a typical interior salt dome, and has the usual quaquaversal structure. The total relief between the lowlands and the rim of hills of the salt dome is 120 ft. approximately. The central part of the dome, represented by the outcrop of calcite rock which is the quarry, is slightly basin-shaped. The calcite of the quarry, or the cap-rock of the salt dome, outcrops over an area of 150 acres with very little overburden. In the quarry, a face of 70 ft. of limestone is exposed. A highly fractured condition of the limestone mass exists in the quarry, hence no attempt is made to quarry building stone.

An exposure of the unweathered cap rock in the quarry face shows the irregularity of a blue-gray banding which changes laterally, in a distance of a few feet, from the width of a pencil mark to bands more than one inch. An examination of a specimen by the U. S. Geological Survey reveals a coarsely crystalline white limestone with thin fine-grained gray bands, partly continuous and partly continous



General view of Southern Mineral Company's plant

Note shattered, faulted condition of the limestone in the quarry

twisted, shattered, faulted, as if the material of the rock has been rearranged with some displacement. There are cavities of varying size, elongated parallel to the bedding, into which terminated crystals project, and having orange-brown impurities along the walls. A thin section shows very large calcite crystals which, at extinction have a mottled and flecked appearance. The flecks seem fibrous, with orientation in two directions. By immersion of the crushed material of the rock in a liquid of index equal to that of calcite, these are found to be not inclusions but planes developed in the rock, presumably by pressure. Inclusions, on the contrary, are very scarce, and consist mostly of small dirty granules, probably argillaceous. At one point, a small fragment of what appeared to be anhydrite was seen lying between calcite grains. The black or blue-gray bands in the rock consist of fine-grained matter of argillaceous texture, disseminated in and around the calcite crystals apparently with little regard to present crystal boundaries. The crystals in these bands are generally somewhat finer, but the bands are not sharply defined, either in form or character.

Experimental kiln of Southern Mineral Company

From the foregoing facts it is believed that this lime rock is secondary, and some geologists have advanced the thought that it might be formed of altered gypsum.

It is an interesting fact, despite the black or blue-gray banding in the rock, that when this rock is burned in a kiln, the lime is pure white, with no impurities showing and it is very high in caustic value. The company has an experimental kiln in which it has experimented considerably.

The analysis of the lime rock of the quarry is as follows:

Stripped area in No. 3 quarry. Main incline at left. Pump station in distance

Quantitative Analysis	Per cent
Silica as SiO_2	1.25
Iron and aluminum	1.50
Calcium as CaO	59.95
Magnesium as $Mg_2P_2O_7$	1.20
Sulphates	.82
Loss on heating, carbon dioxide, over	35.00
Combining results	
Calcium carbonate as Ca CO_3	85.33
Calcium oxide as CaO	9.18
Silica as SiO_2	1.25
Iron and aluminum as Fe and Al	1.50
Magnesium as Mg	1.20
Sulphates	.82
Loss at 102 degree C	very small

Gypsum has been exposed in the quarry on the top of the dome. The company intends working to the gypsum and, when a large enough area is exposed, to quarry it and to make plaster. Anhydrite has been found in well cores, while pyrite and sulphur have been found in the quarry or on the dome. Free sulphur has not been found, but sulphur has been found in combination as high sometimes as 11 to 50 per cent. In the southwest portion of the quarry, barium sulphate has been found.

A conservative estimate indicates 150 acres of workable rock, with very little overburden. Extra stripping could increase this area considerably. The thickness of the lime on top of the dome is 170 feet. Underlying this is 200 to 250 feet of gypsum and a little anhydrite. The salt is found at a depth of 400 to 450 feet. One well has been drilled into this salt for a distance of 1,200 feet.

The steepness of the dip of the formations, which is shown by outcroppings of strata on the side of this particular dome to be 70 degrees, is corroborated by finding the salt in one well on the dome at a depth of 435 feet and, in another well located not over 500 feet distant, at a depth of 1,600 feet.

The surface of the lime at the beginning of the working of the quarry was three feet above the water-level.

An area of 25 acres is now opened and three levels are being worked. The lowest level is 65 feet lower than the original level. The general aspect of the quarry is that of a circular basin. A peculiar difficulty encountered is the washing of dirt and soil from around the periphery into the quarry. This dirt must be handled with the rock for there is no way to keep it separated. Another difficulty is soil deposit in the crevices and fractures in the lime, which fact is characteristic of all salt domes.

With the water level of the quarry only three feet below the original working, drainage of the quarry demands attention, because the rain-water drains into the quarry from the area included in periphery of hills. The normal drainage was solved by digging three wells in the quarry, each about 50 feet in depth. The suctions of two Gardner duplex steam pumps are connected to these wells and the water is pumped to the mill where it is used to wash the rock. Because of the amount of dirt that is mixed with the rock material, the company finds this water an asset instead of a liability.

To take care of the additional rain-water two second-hand Amsco centrifugal pumps are used. These pumps have 14-in. suctions and 12-in. discharges. The suctions are run into a small sump, with its bottom slightly lower than the lowest level in the quarry. These pumps are run only after a rain, as the pumps in the wells keep all of the levels dry ordinarily.

It has been suggested that the small overburden of the stone might be removed hydraulically, but here again the peculiar structural conditions of the quarry or salt dome are significant. The quarry is the lowest part of the basin.

Blast-hole drilling is done by two Chicago Pneumatic and two Ingersoll-Rand machines. Two Marion 60 and 20 railroad-type steam shovels are used in loading the 40 Western two-way, 2 cu.-yd. dump cars that are used in hauling the material to the mill from the quarry. A large amount of cheap, manual, contract labor is used in loading the cars. A 24-in.-gauge track system is laid in the quarry and to the crushing plant. Two Daven-

Appreciation of the stripping problem can be gained from this view of the quarry

port 7-ton locomotives and two Vulcan 7-ton locomotives are used to handle the dump cars in the quarry and to the hoist.

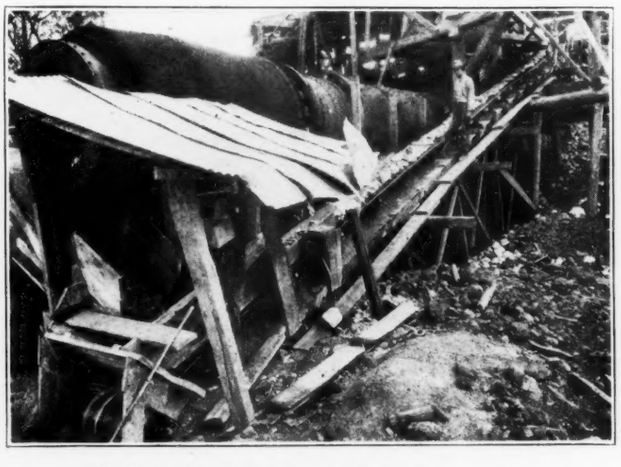
Two pits are opened in the quarry, and the crushing plant is located between them. The movement of the cars to the plant is on an inclined plane from both pits. A Lidgerwood twin steam-engine hoist pulls the cars up the trestle, and has a capacity of six cars per trip. The trestle has a storage capacity of about the same number of loads.

The plant is of conventional design and is Allis-Chalmers equipped throughout. However there are a few interesting departures that were made to meet local conditions and which are most interesting and original.

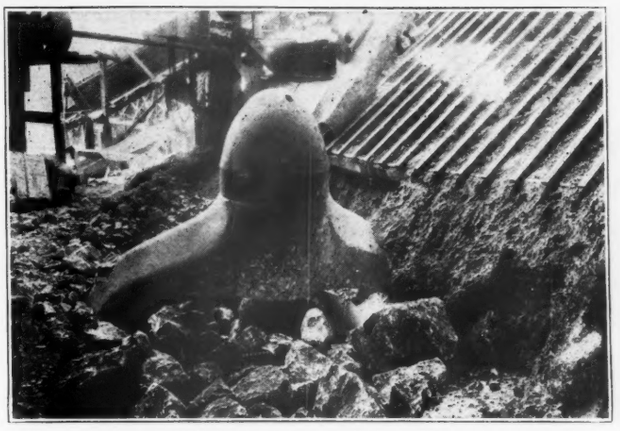
Routing of the Stone Through the Plant

The stone as dumped from the cars is passed over a 9-in. grizzly made of railroad steel with the ball turned up and the flanges trimmed. Stones 9 in. in size and larger go directly, by gravity, into an Allis-Chalmers No. 9 gyratory crusher. Stones this large are clean and do not need washing. Stones smaller than 9-in. in size are fed by gravity, from a hopper underneath the grizzly, to a washer. There is a great deal of soil with this material, and the washing of it proved difficult. Many washers were tried but were not efficient and economical enough or did not have the capacity necessary to take care of the large volume. This serious problem was solved by J. M. Jenkins, superintendent of the quarry and plant, in a very interesting, practical, and efficient manner.

The washer is a homemade device. It was made from, or rather is, a 6-ft. diam., 60-ft. length of Allis-Chalmers rotary lime kiln. The linings were taken out, only the shell being used. Reducing collars are placed at 20-ft. intervals, to retard the stone. Perforations were made in the shell with acetylene torches and air drills. Approximately 15 ft. from the receiving end of the washer is blank. The next 15 ft. is perforated with ¼-in. holes, followed with 15 ft. of ½-in. holes, and the last 15 ft. with ¾-in. holes. A four-inch wash-pipe extends through the center of the washer. Perforations for jets of water are located in this wash-pipe at close intervals. An outside wash-pipe is run the entire length of the washer with jets of water to keep the perforations from becoming clogged. The washer is located above an inclined floor or trough that has baffles at regular intervals to precipitate the finer size stone or screenings. All the slush from the washer, after passing over and through the baffles, is discharged over two double-screw conveyors, which take the limestone screenings to storage bins. Water is sprayed over the screws to remove any silt that might be left in the screenings. There is a considerable amount of this fine screenings and a very efficient recovery is made, as no stone is carried over or away with the slush. About 600 tons of stone is handled per day by this washer and the time for a stone to go through the washer is only 7 minutes. The drainage water from the drainage wells in the quarry is used as the wash water in the washer.



Washer, showing return conveyor to crusher



Grizzly and primary crusher

Crushers and Screens

From the washer, material larger than screenings, is routed on 36-in. belt conveyors to the No. 9 or primary crusher. From the primary crusher the material is elevated by a 36-in. bucket belt elevator and discharged into an Allis-Chalmers Worthington 42-in. by 12-ft. scalping screen. All material of 2¾-in. size and under is taken out and elevated by a 36-in. bucket elevator to an Allis-Chalmers revolving 60-in. by 24-ft. sizing screen which prepares four sizes and distributes each separate size into a 200-ton-capacity bin. From these bins it is loaded into railroad cars.

The material from the scalping screen over 2¾-in. in size is conveyed to two Allis-Chalmers gyratory crushers No. 5 and No. 6. From these crushers it is conveyed by bucket belt elevators to the sizing screen and then to the storage bins.

The storage of the plant consists of six 200-ton-capacity bins and ground storage. A by-pass to the storage bins can be made, and the material

conveyed by a 36-in. belt conveyor to ground storage. From the ground storage the material is loaded for shipment by a John F. Byers ¾-cu. yd. loader.

The company has endeavored to create a surplus supply on the ground storage, but owing to unusual demands for the products of this plant, no surplus has been possible. The State of Louisiana is to put on a pretentious program of road building, and as this quarry is the only source of lime rock within a hundred miles, it is improbable that the plant will accumulate much ground storage material.

The Southern Mineral Company operates a six-mile railroad of its own. It has its own locomotive, train crew and track crew. The locomotive is a six-driver standard Baldwin locomotive. The train crew does all switching of the cars for the plant in loading and placing them. It also hauls the cars to the junction of this company's track and that of the L. R. N. Railroad, which intersection is one mile from the town of Winnfield, Louisiana. From this intersection the company has trackage rights over the L. R. N. Railroad to the R. I. Railroad, the L. and A. Railroad, and the Tremont and Gulf Railroad, all of which have an interchange at the town of Winnfield. These four railroads give the company ideal shipping facilities for their products in any direction.

The plant runs ten hours per day and turns out approximately 1,000 tons of crushed stone. This is an excellent record when the number of products the company handles, is considered. Road ballast, concrete aggregate, rip-rap, ground limestone for soil purposes, and screenings for macadam road paving are some of the requirements made upon the plant.

To supply a demand for finer reduction in materials an Allis-Chalmers Superior McCully fine-reduction gyratory crusher has been ordered and will be installed.

An operating force of 150 men is employed in the quarry, plant, on the railroad, and in the machine shop. A great deal of hand contract labor is done in the quarry, as previously stated.

The machine shop is fully equipped and contains a forge shop. All the repair work of the plant or the quarry can be done, except the larger and heavier jobs.

The president of the Southern Mineral Company is Dr. I. L. Lyons of New Orleans, La., who is also interested in a large drug business and other enterprises. Other able officers of the company are Warren Kearney and J. F. Coleman, vice-presidents; George J. Lyons, secretary and treasurer, all having headquarters in New Orleans.

J. M. Jenkins, superintendent of the plant and quarry and in active charge of the operations, is a product of the plant itself. He has been with the plant since 1912. He says he grew up with the plant but it is better said that the plant grew up with him. Various methods have been tried in the quarrying of this stone and the crushing plant operations, but to Mr. Jenkins' originality in solving the peculiar operating problems is due the credit of the fine results obtained. H. B. Bozeman, of Winnfield, La., is the general sales manager of the company.

Second Regional Safety Meeting in California

Representatives of the Calaveras Portland Cement Co., Cowell Portland Cement Co., Monolith Portland Cement Co., Pacific Portland Cement Co., Riverside Cement Co., Santa Cruz Portland Cement Co., Southwestern Portland Cement Co., Yosemite Portland Cement Co., and the Portland Cement Association assembled for a Regional Safety Meeting in the Biltmore Hotel, Los Angeles, Calif., on September 24, 1929. This is the second meeting of this class to be held recently in that state.

The following program will indicate the nature of the discussions, the entertainment and the anticipated results from such a meeting:

Registration 9:30 a. m.

Morning session 10:00 a. m.

Meeting called to order by the Chairman, Loren C. Barton, Vice President, Riverside Cement Company.

Report on Progress of Accident Prevention Work in the Cement Industry—A. J. R. Curtis, Assistant to General Manager, Portland Cement Association.

Before and After Safety Training. H. Sergeant, Safety Engineer, Southwestern Portland Cement Company.

How to Attain a Perfect Safety Record—E. D. Barnett, Supt., Cowell Portland Cement Company.

Luncheon, Sala de Oro, 12:15 p. m.

Afternoon session 2:00 p. m.

Wilford S. Trueblood, Production Manager, Monolith Portland Cement Company, presiding.

Electrical Hazards—Sam Haver, Manager Employment Department, Southern California Edison Company.

The Yardstick of Safety—A. S. Bilderback, Safety Engineer, Riverside Cement Company.

First Aid Discussion and Demonstration, supervised by A. S. Bilderback, assisted by Messrs. Mullan, Lever, Starr, Mills and Brockamp. Necessary equipment furnished by E. D. Bullard & Company, Los Angeles.

Round Table Discussion—Mill Accidents, Quarry Accidents, Packing Accidents.

Dinner, Music Room, 6:30 p. m.

L. V. Robinson, supt., Southwestern Portland Cement Company, toastmaster.

Address: R. M. Wood, Manager Department of Personnel, Standard Oil Company of California, Los Angeles, and President of the Los Angeles Chapter of the California Society of Safety Engineers.

Remarks by Garner A. Beckett, General Manager Riverside Cement Company.

What Screen Shall I Use for Handling My Crushed Stone?

By HARRY L. STRUBE*

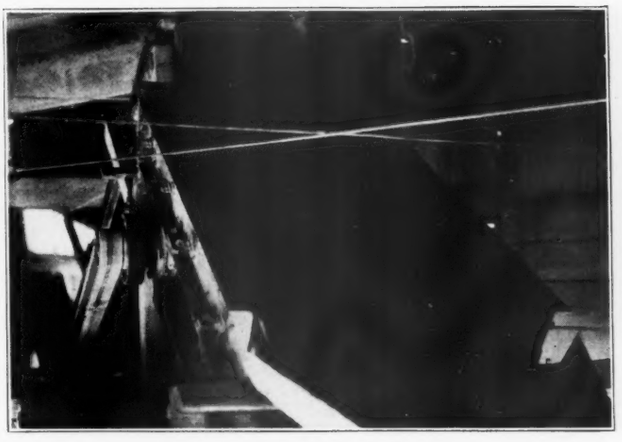
THE DEMAND for clean material, brought about by more rigid specifications and the competition of properly washed gravel, makes it imperative for stone producers to remove all crusher dust from their rock, as well as to do more accurate sizing.

When thinking about screening problems, there are usually three types of screens which come to mind, (1) the disc grizzly, (2) the rotary screen, and (3) the vibrating screen.

In more modern plants the tendency is toward the use of the disc grizzly and vibrating types to the exclusion of the rotary screen, for reasons which will be enumerated later.

The company that makes all types will quickly tell you that each has its field of applicability in the stone producing industry, and that it is always wise to consult the engineers of such a company, or, for that matter, any engineers who are in position to render an unprejudiced and experienced opinion on the type of screen that should be used on your particular work—each case deserving individual study. You can't safely decide that you need a vibrating screen just because Tom Jones is getting good results with his. His conditions may be different in some important detail, such as the size of the stone handled, the handling capacity per hour, the space available, or the method or manner of delivery to the screen.

Better submit your conditions, and facts as to what you want to accomplish, to the company that you think has had the widest experience in applying both types of screens, and let its engineers assist you in selecting proper equipment, for this will prove a great deal better than definitely specifying one type or another, and carrying the whole burden, yourself, of making the right selection.



Vibrating screen with 6-mesh cloth for handling limestone grit

It has been the writer's experience that the vibrating screen gives best results in handling the finer stone, up to say 2½-in. and under; and that the disc grizzly should be used for handling the larger sizes.

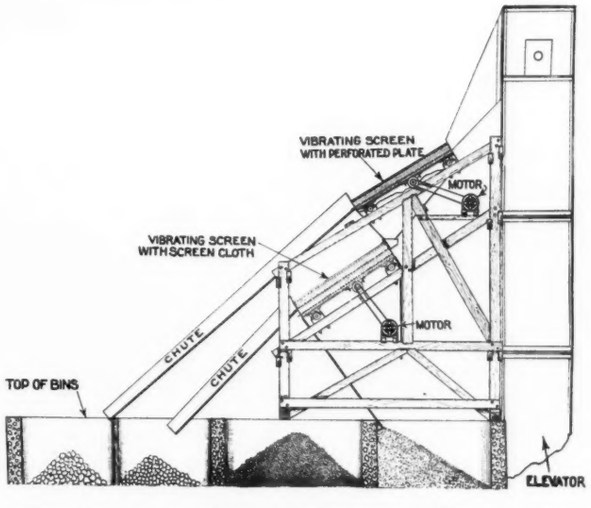
"For handling stone 2½-in. and under, there is no real comparison in the results obtained, between the vibrating screen and the revolving screen we formerly used," says the Riverton Lime Company of Riverton, Va.

The installation of two vibrating screens, located over the storage bins, is shown rather clearly in the accompanying drawing. You will notice that the upper screen, of single deck type with a perforated plate screening surface, is fed the 2½-in.-and-under-size stone from a bucket elevator, and that what passes through the perforations of this screen is delivered to the double-deck lower screen (with wire-cloth screening surface) for further screening and sizing.

Thus 4 sizes of stone are made, but that is not all, as by simply substituting screening surfaces having different size perforations, other sizes of stone can also be produced.

The Riverton people are especially well pleased with the quickness with which either the perforated plate or the screen cloth can be replaced on the vibrating screen, when other sizes of stone are ordered than those regularly stored and called for.

* Engineer, Link-Belt Company, Philadelphia.



Elevation of vibrating-screen plant at Riverton Lime Company

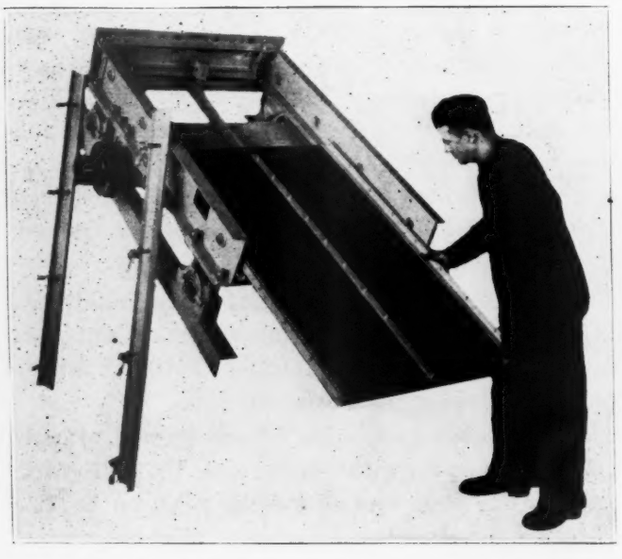
The change can be made in just a few minutes, to suit any market condition.

One of the illustrations shows that the removal of the screening frame of the average vibrating screen is indeed a most simple and inexpensive operation. Here then is an advantage that the vibrating screen has, as compared with the greater expense, the more laborious task, and the longer time required for substituting other size screening plates on a revolving screen.

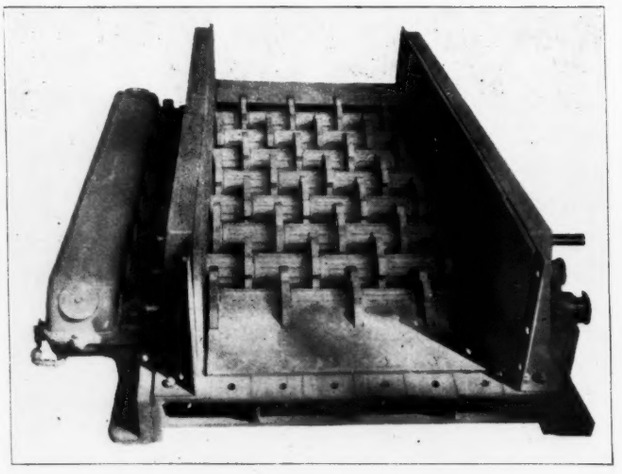
Another illustration shows a single-deck 3-ft.-wide by 5-ft.-long vibrating screen in the plant of Yoch & Roberts, Norristown, Pa., a screen that enables them to market 35 per cent of the limestone grit for from 2 to 3 times the price formerly obtainable for unscreened grit. The feed is direct from a portable belt conveyor. The greater demand for the screened grit and the higher price obtainable for it are factors that have made their screen a very profitable investment.

In handling these smaller sizes of stone, the uniformly mechanically-vibrated screen will produce a better separation of the stone, with greater efficiency, within less space, with less power, with smaller upkeep, and with less supporting framework, than any other type of screen you can use. In the vibrating screen, every square inch of screening surface is working, whereas not over one-third of the revolving screen surface is in contact with the material to be screened. In a revolving screen, the material is not stratified in the same manner as in the vibrating screen. With the former, the larger pieces run faster than the smaller, and remain along the lower edge of the material where the most effective screening should be done. This means that the oversize pieces are continually in the way of the undersize and thus prevent quick effective screening.

The larger sizes of stone cannot be well handled



Showing insertion of screen-cloth in vibrating screen



Roll grizzly

on the vibrating screen because of their comparatively heavy weight and irregular shapes. They become wedged in the openings and are difficult to dislodge, and any attempt to do so is usually detrimental to screening efficiency. The disc grizzly with its low angle of incline, and with the dislodging action of its rotating discs, is an ideal medium for the larger openings, say 1½-in. and up.

The advantages of the disc grizzly (see illustration) over the rotary screen, may be summed up as follows:

1—More accurate separation, with larger capacities.
2—More compact.
3—Easier to support and maintain.
4—More accessible.
5—Simpler and cheaper drive.
6—Less power to operate.
7—Effective over its entire area.

It will thus be seen that the disc grizzly and the vibrating screen have practically the same things in common—features and advantages which have been readily appreciated by stone producers when considering new plants or changes to old installations.

Nova Scotia Produces Gypsum in Increasing Tonnages

Production of gypsum in the province of Nova Scotia has continued to record increases during the past few years and the output for 1928 established a high level at 972,211 tons. This represents an increase of approximately 14 per cent over the total for the previous year, and the total represents about 78 per cent of the entire production of the Dominion. Fourteen companies operated in the province during the period under review. Of the total mined, 8,720 tons were calcined in Nova Scotia and the balance shipped to Montreal or points in the United States.

Recently Enlarged Plant of Sowerbutt Quarries Simple but Highly Efficient

This Company Was a Pioneer Among Crushed-Stone Producers

By W. E. TRAUFFER

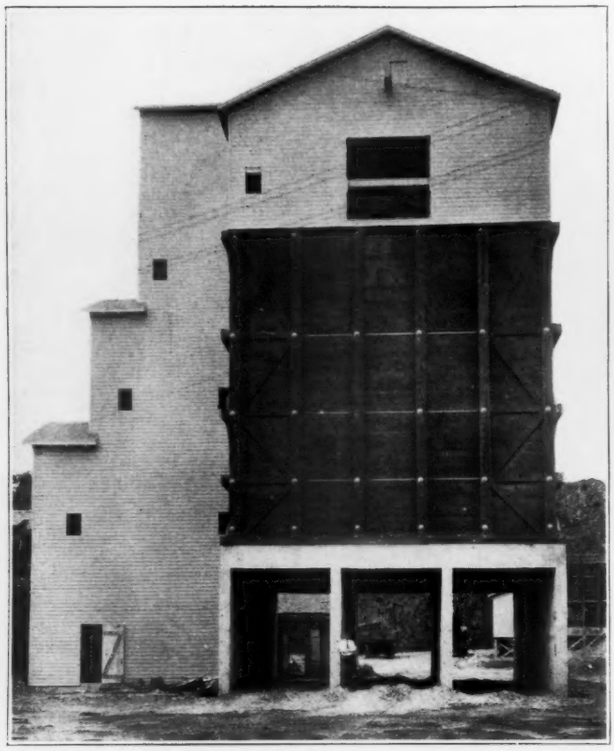
THE crushed stone plant of Sowerbutt Quarries at Paterson, N. J., is one of the pioneer operations in that section of the country. The first plant was erected in the present location in 1902 by James S. Sowerbutt who was prominently identified with the carriage and wagon industry. This was a small plant and, by 1910, the demand for the product had increased to such an extent that it was decided to enlarge the plant. In 1913 larger crushers were installed and the whole plant again enlarged.

Following the death of Mr. Sowerbutt in 1916, the business was taken over by Abram Vandermade who has operated the plant since. He further increased the capacity of the plant, in 1919, by installing three Farrel-Bacon type B jaw crushers—a 36-in. by 24-in., a 36-in. by 6-in., and a 20-in. by 10-in.—furnished by Earle C. Bacon, Inc. All of the crushers used in the past were of the same make and type. In the spring of 1926 a large storage bin was erected on which the screen house was supported.

Further additions, which were completed about August 1 of this year, make the plant an entirely modern operation. The addition was designed and most of the equipment furnished by Earle C. Bacon, Inc. The new buildings erected were the crusher house, the scalping-screen house, an addi-

Batch hopper beside cement-storage house

Sowerbutt plant from north, crusher house in foreground



Main mill. Batching bin discernible in right background

tional screening building, and conveyor housings connecting these. The plant now has a capacity of 1,200 cu. yd. per day.

Quarrying Operations

The deposit is a uniform traprock hard enough

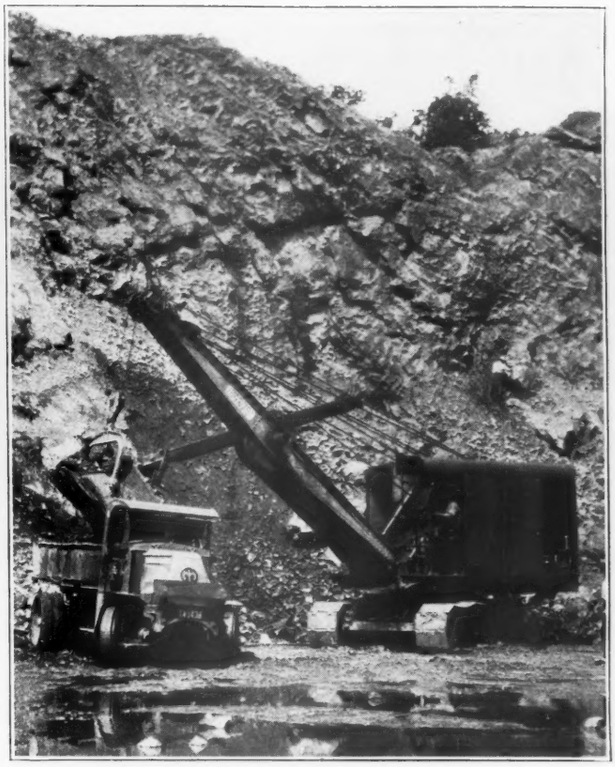
Truck dumping sand into batch hopper

to easily pass the New Jersey state highway department's strict specifications for concrete stone. The property consists of 60 acres located about 2½ miles west of the heart of the city. The overburden, which averages less than 2 ft. in thickness, is removed by an Erie ¾-cu. yd. crawler steam shovel and is hauled away in trucks.

The quarry face, which is about 60 ft. in height and forms a semicircle less than 600 ft. in diameter with the plant at its center, is shot down in three levels. Chicago Pneumatic, Ingersoll-Rand, and Cleveland jackhammers with 1¼-in. steel are used for drilling blastholes. DuPont 60-per cent dynamite and electric blasting caps are used. Be-

Looking down upon second level of quarry. Trucks being loaded in background

Truck discharging into primary crusher



Truck loading by power shovel

cause of the close proximity of residences, about 12 holes only are shot at one time, this being every other day. Chicago Pneumatic jackhammers with 7/8-in. steel are used for secondary drilling.

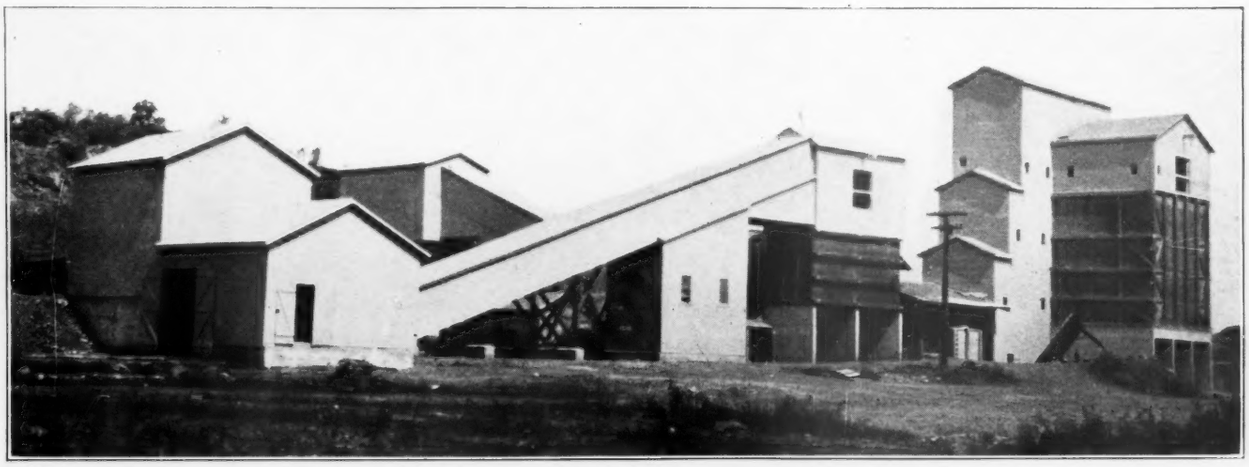
The stone is loaded by a Thew Lorain 75 gasoline crawler shovel into two 5-ton trucks, one a Mack, the other an Autocar, both equipped with steel end-dump bodies. The unusually smooth quarry floor and the short haul make this method of haulage economical.

Plant Operations

The trucks run up an incline and discharge into the 60-in. by 42-in. Farrel-Bacon type B jaw primary crusher which reduces 40-in. stone to 4-in. size. This is belt-driven by a 200-hp. electric motor. The crusher discharges onto a Bacon 36-in. inclined belt conveyor on 115-ft. centers which feeds a 58-in. by 12-ft. Bacon manganese-steel scalping screen with 2¼-in. perforations. These are both driven from the same 50-hp. motor.

The stone passing through the screen drops onto a 20-in. Bacon inclined belt conveyor on 120-ft. centers, which feeds a 48-in. by 24-ft. Bacon sizing screen in the new screening building. These are driven from the same 30-hp. motor. This screen has a jacket allowing the production of four sizes of material. The stone under ¾-in. goes to two Hum-mer single-deck vibrating screens arranged in tandem and producing two sizes of stone and dust. Each size goes through a steel chute to one of six compartments in the 400-cu. yd.-capacity storage bin. Two passageways under the bins allow loading into trucks for distribution. Bacon Perfect self-closing gates are used.

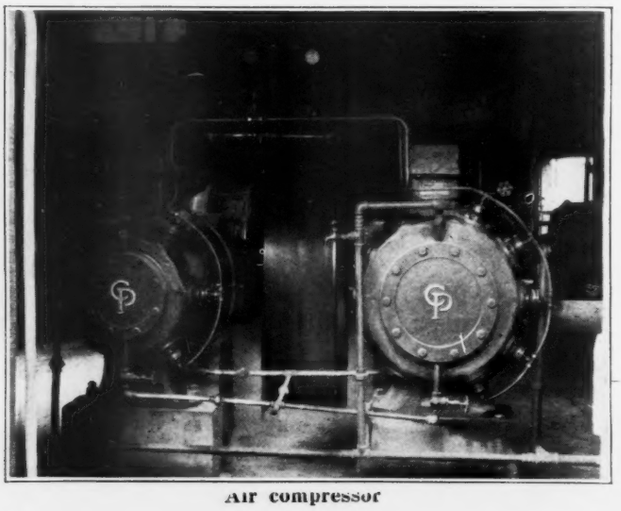
The oversize from the first scalping screen is chuted to the 24-in. by 36-in. Farrel-Bacon type B jaw crusher, previously described, in the older part of the plant. This discharges into a short conveyor feeding a 24-in. Bacon belt bucket eleva-



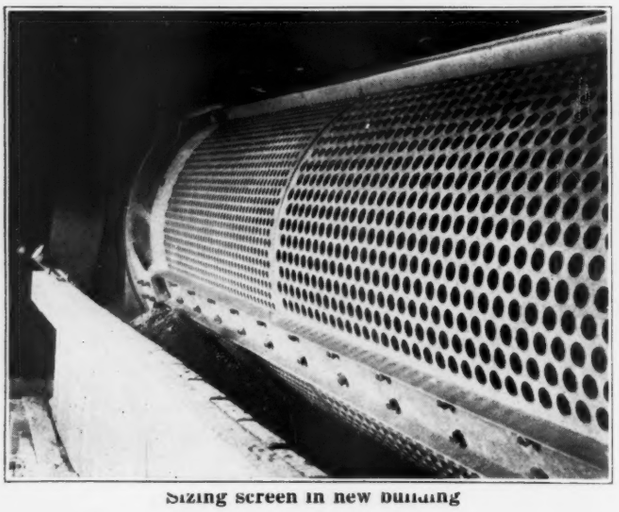
Sowerbutt plant from southwest

A blast in the quarry

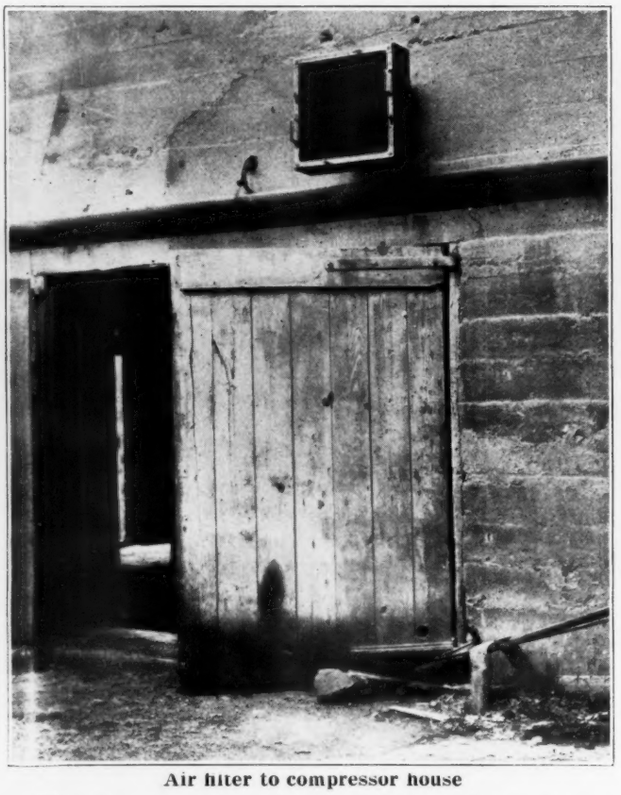
tor on 70-ft. centers which discharges into a 60-in. by 18-ft. Bacon scalping screen with 2-in. perforations. The oversize goes through a split chute to the 36-in. by 6-in. and the 20-in. by 10-in. Farrel-Bacon type B crushers. These discharge onto the same conveyor and elevator to the second scalping screen.



Air compressor



Sizing screen in new building

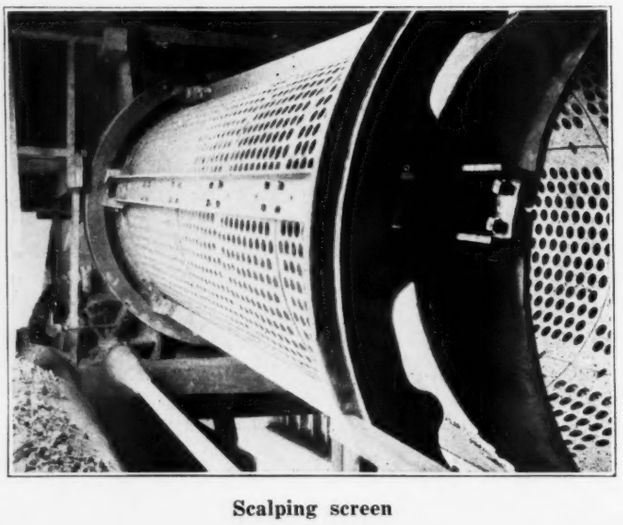


Air filter to compressor house

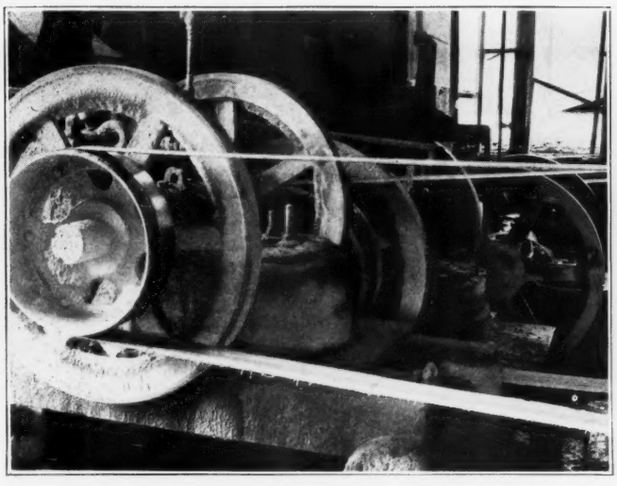
The stone passing through this scalping screen goes to two Kennedy-Van Saun 24-ft. sizing screens, one 40-in. and the other 48-in. diameter. Six sizes of material are produced here, these sizes going to six compartments in the 1,200-cu. yd.-capacity storage bin. Bacon Perfect gates load into trucks for distribution. The two small crushers are driven by a 75-hp. motor, the elevator and second scalping screen by a 50-hp. motor, and the two sizing screens by another 50-hp. motor.

Distribution

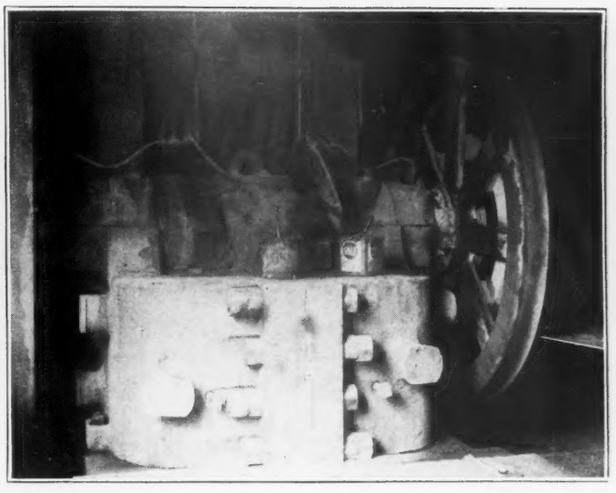
There is also a 116-ton-capacity Blaw-Knox two-compartment steel bin, with volume batchers of the same make, for loading into batcher trucks. Trucks from the plant feed this bin and the sand is obtained from local pits. Cement also is loaded



Scalping screen



Three reduction crushers



Primary crusher

with each batch from a nearby storehouse. Another Blaw-Knox batching bin is being installed. This has a 200-cu. yd-capacity and is equipped with Blaw-Knox weighing batchers.

All deliveries are made in hired trucks, most of the product being sold in and near Paterson for road building and construction work. Sized material is stored in the winter months in stockpiles from which it is recovered in the spring by a Haiss stockpile loader and the Erie steam shovel.

Miscellaneous

Plant operations are entirely electric, General Electric motors, transformers, switches, and other electrical equipment being used exclusively. Power is obtained from wires of the Public Service Corporation of New Jersey at 2,700 volts and is reduced to 440 volts for plant operation. Drive belts were furnished by the Manhattan Rubber Company.

A New Jersey Foundry and Machine Company 30-ton-capacity overhead traveling crane above the primary crusher is used for handling a stone hook or any repair parts. Another crane of the same make is over the secondary crushers. This is of 8-ton capacity and is chain operated. A small concrete-block building adjoining the old screening building houses the two motors driving the secondary crushers and a Chicago Pneumatic simplate valve size 15 9-in. by 10-in. air compressor which furnishes air for the drills. This is belt driven by a 125 hp. motor and has a Reed air filter on the intake to insure against wear due to dust getting into the compressor.

Self-Unloading Barge for Cement

The first all-steel self-unloading barge for transporting bulk cement in Chesapeake waters was launched September 30 at the plant of the New York Shipbuilding Company at Camden, N. J. This barge was built for the Lone Star Cement Company Virginia, Incorporated, and will be used to transport bulk cement from the company's South Norfolk, Va., mill to its Washington, D. C., warehouse. Mrs. Dwight Morgan, wife of the vice-president and manager of the Lone Star Cement Company Virginia, Incorporated, christened the barge the Lone Star No. 1.

The barge is 163 feet in length and has a beam of 37 ft. 4 in., with total capacity of 5,600 barrels of cement.

In explaining the purpose of the new barge, Dwight Morgan said:

"The launching of the barge Lone Star No. 1 at Camden emphasizes several points which we believe are of real significance to this community. In the first place, this barge is part of the equipment which makes it possible for us to extend farther afield than would normally be the case, the market for a product made in Norfolk. As previously announced, the company is constructing special warehouse facilities in Washington, D. C. By providing the most economical means of transportation to this growing market, we are establishing a necessary outlet for the product of Norfolk labor.

"Another fact that should be emphasized is by making use of the low-cost transportation of the natural waterways of the country we are leaving no stone unturned in our effort to market our output against the invasion of foreign cement as far as it is humanly possible to do in the presence of such a glaring disparity between the low wages and transportation costs paid by foreign cement manufacturers and the prevailing American wage standards and transportation costs."

Asphalt Association to Meet at West Baden

The last four days of this month will prove eventful for men in the asphalt-paving industry, as the Eighth Annual Conference will then be in session at the West Baden Springs Hotel, West Baden, Ind.

These Quarries and Plants Near Columbus, Ohio, Produce Various Crushed Limestone Grades

Marble Cliffs Quarries Company Maintains Large, Steady Operations

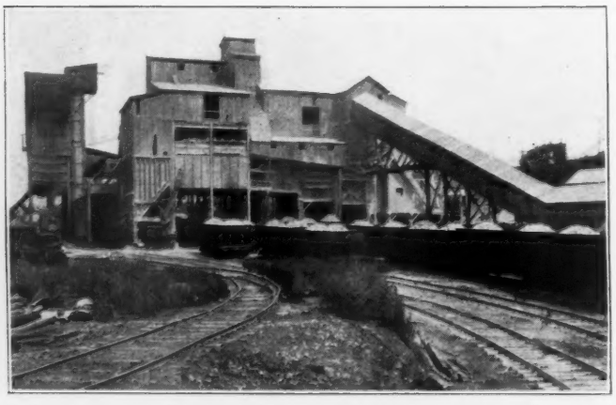
By THOMAS L. COLLINS

THE Marble Cliffs Quarries Company, the second largest of its kind in the world, is operating two stone quarries and two crushing plants about six miles northwest of Columbus, Ohio. A modern lime plant, a pulverized limestone plant, a ready-mix mortar plant, and an asphalt mixing plant are operated as subsidiaries.

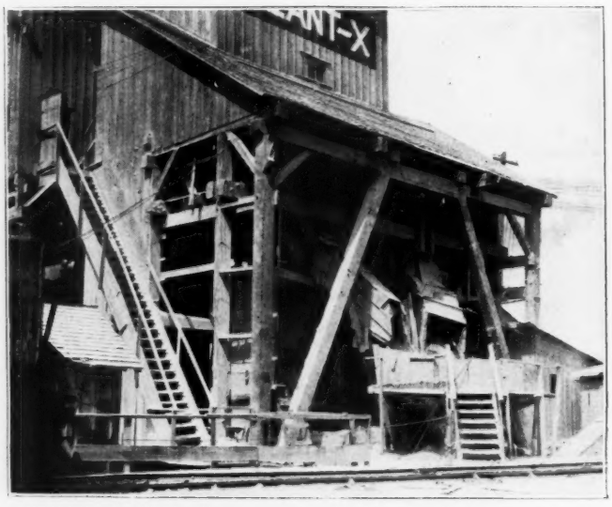
In 1913 this company was formed from a consolidation of four concerns: the Scioto Stone Company, Woodruff & Parisch, the Casparis Stone Company, and the Columbus Stone Company. A total of 350 men are employed. The present property consists of two crushing plants, Plant B and Plant X; the lime plant and four quarries; the Scioto quarry, just north of Plant B; the Central, south of Plant B; the Hobo, about a mile west of Plant B; and the Williams quarry which lies between Plant B and the Scioto quarry. The Central and Williams quarries have been closed down indefinitely, the plan being to concentrate operations in the Scioto and Hobo quarries which are equipped to supply all the stone needed.

The company owns a strip of territory about three miles long, the width varying from one-half to one-and-one-half miles wide along the Scioto river. It is on the main line of the Pennsylvania railroad and has switching connections with the Toledo & Ohio Central division of the New York Central railroad.

Both quarries are operating in a bed of Delaware limestone. The first bench consists of 22 feet of blue stone, very hard and somewhat flinty. It makes excellent road-building and concrete material. The second bench consists of 42 feet of limestone which contains a very high percentage of lime (about 97 per cent). It is from this bench that stone is used for the lime plant and for producing pulverized limestone. Underlying this second bench is a bed of dolomite rock.



General view of plant X

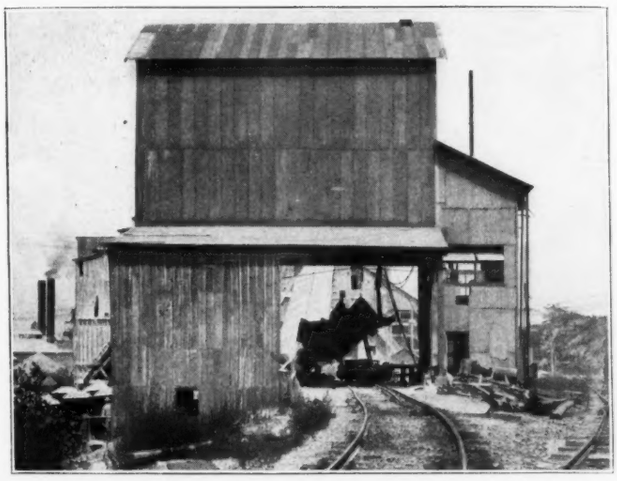


Plant X showing chutes to secondary crusher

The overburden at both the Hobo and Scioto quarries consists of black, loamy soil with considerable sand, easily removed. It is removed by steam shovel and dump cars, the material being dumped into old quarry holes.

For drilling the ledges, Cyclone portable-type well-drills are used. Four of these operated by electric motors, and two operated by gasoline motors, are in service at the Scioto quarry; and four operated by gasoline motors are used at the Hobo quarry. Holes are drilled with 4½-in. bits, and average about five in. in diameter. They are sunk to the bottom of the ledge. For blasting, Trojan dynamite 40 and 60 per cent is used. From 250 to 300 pounds are used in the 42-ft. holes. This work of shooting the ledges is planned so that it is all done after the quarry has shut down for the day. When the ledge has been shot, pop shooting is used on the larger stone.

At the Scioto quarry, four steam shovels are used for loading stone into the dump-cars, two of these being Marion model 92, and two, Marion model 100. Each of these shovels is equipped with a 3½-cu. yd. dipper and 1½-inch chain. The shooting of the ledges in the Scioto quarry breaks up



Crusher house at plant X

the stone sufficiently so that it is not necessary to use jack-hammer drills, although occasionally pop shooting is used on the larger stones.

The Scioto quarry supplies stone for both crushing plants, as well as the lime plant, the stone for the lime plant going through the crushing machinery at Plant X. For hauling the stone to the crushing plants, 125 cars are used. These consist of Watt steel dump-cars, K & J steel dump-cars, and K & J wooden dump-cars. Their capacity is eight tons each. For hauling the dump-cars, seventeen 30-ton steam locomotives are used. These locomotives are American, Porter, and Shay machines. One 50-ton American steam locomotive also is used for general switching around the quarries and crushing plants.

For moving the material around the quarries, crushing plants and storage yard, for unloading coal, and for use in other parts of the plant wherever required, two locomotive cranes are used, one American with a 2-cu. yd. bucket and one Orton-Steinbrenner with 2½-cu. yd. bucket. They are equipped with ⅞-in. cables.

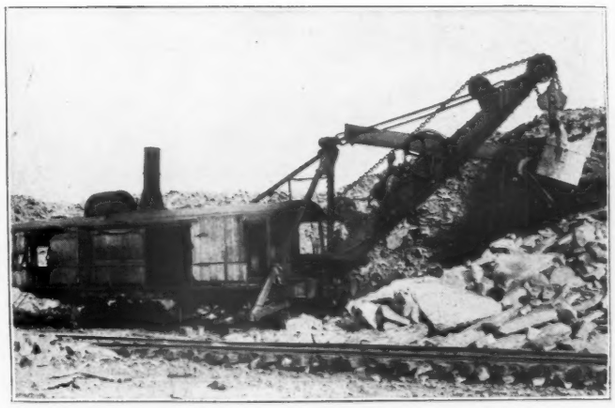
For hauling the stone from the Hobo quarry, which supplies stone only for Plant X, a complete electric system is used, consisting of 12 steel side-dump cars, holding 15 tons and operating on about five miles of track. The third rail system is used, a motor being installed on each car. The cars operate automatically and travel from the quarry to the crusher with no attendants. This entire outfit is a Woodford system, with an Allis-Chalmers motor generator set operating on 440 volts, manufactured and installed by the Woodford Manufacturing Company. The cars used on this system were built by Kilbourne & Jacobs Manufacturing Company.

At the Hobo quarry, three Marion No. 100 steam shovels and one Marion No. 92 steam shovel are used. A small Ohio Power Shovel Company, Model 101 gasoline shovel also was being used at this quarry for stripping operations when this article was written.

At Plant B, the cars are pulled up an incline with a Worthington drum-hoist, operated by an Allis-Chalmers 150-hp. motor, and equipped with 1⅛-in. cables. Two parallel tracks are used, the cars being arranged to dump at either side by an electric drum hoist, operated by a 10-hp. Allis-Chalmers motor. At Plant X, the dump-cars are shoved onto the track in the crusher house by one of the locomotives and their loads then dumped into the primary crusher by an electric drum hoist, operated by a 10-hp. Allis-Chalmers motor. Both of these hoists were originally Allis-Chalmers steam hoists.

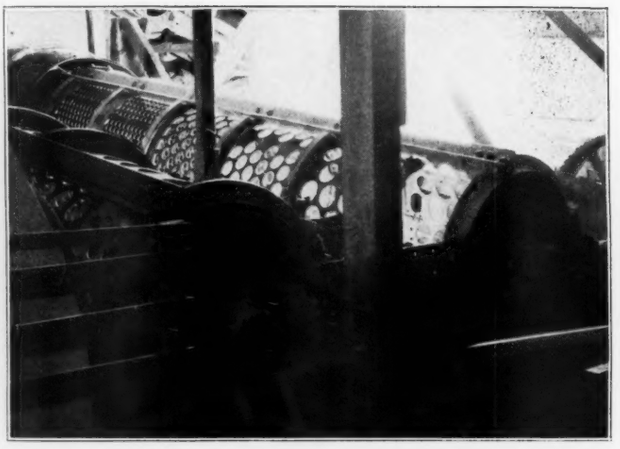
The primary crushing at Plant B is done by a No. 21 Allis-Chalmers crusher, which has a capacity of 500 tons per hour. It is operated by a 200-hp. Allis-Chalmers motor. This crusher takes the stone as it comes from the quarry and reduces it to 4-in. and smaller. From there the stone is conveyed by bucket elevator to a 5½-ft. Symons cone crusher, operated by a 150-hp. Allis-Chalmers motor. A No. 8 Allis-Chalmers operated by a 150-hp. Allis-Chalmers motor, and a 4-ft. Symons cone crusher, operated by a 100-hp. Allis-Chalmers motor also, are in service at this plant, these being used as relief and auxiliary crushers. The No. 8 Allis-Chalmers crusher is used only when it is necessary to shut down the large Symons cone crusher, and the small Symons cone crusher is used to produce the smallest grades. These two Symons crushers were installed last winter and have given excellent service. This plant produces various sized-stone graded from 4-in. to dust.

The primary crushing at Plant X is done by an Allis-Chalmers model 21, operated by a 200-hp. Allis-Chalmers motor; the recrushing by two No. 6 Allis-Chalmers crushers operated by 40-hp. Allis-Chalmers motors; one 7½-ft. Symons cone crusher operated by a 150-hp. Allis-Chalmers motor; and one 4-ft. Symons cone crusher operated by a 100-hp. Allis-Chalmers motor. This plant produces



Steam shovel in Scioto quarry

Side-dump car used in Hobo quarry



Rear view of large screens in plant X

various sized stone graded from 8-in. to dust. Here the material is conveyed from the primary crushers to the recrushers by a 44-in. 8-ply Manhattan rubber belt, 319 ft. long, operated by a 75-hp. Allis-Chalmers motor.

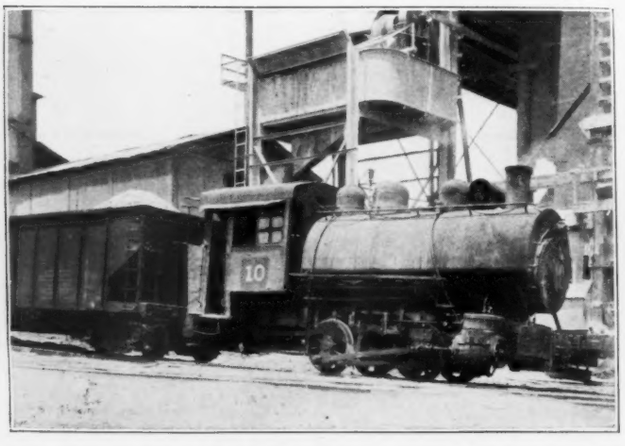
Rotary screens are used at both plants. At Plant B 18 screens are in service. The main screens comprise three Allis-Chalmers, each 84-in. by 24-in. These are operated by the same motor that drives the No. 21 crusher. The rescreening is done by two Allis-Chalmers 60-in. by 24-in. screens, operated by the same motor that drives the No. 8 crusher. The other screens consist of one 16-in. by 48-in. grizzly, one 10-in. by 36-in. grizzly and one 9-in. by 24-in. grizzly, all of the cataract type built by the Robins Conveying Belt Company and operated by a single 100-hp. Allis-Chalmers motor; four Roco screens 52-in. by 60-in., operated by a 20-hp. Allis-Chalmers motor; four Vibrex screens 48-in. by 60-in., operated by 2-hp. Allis-Chalmers motors; and two conical screens made by the Link-Belt Company, one of which is operated by a 20-hp. and the other by a 30-hp. Allis-Chalmers motor. The Roco screens are recent installations, having been put in service only last winer by the Robins Conveying Belt Company.

The screening equipment at Plant X consists of eight screens; two rotary Allis-Chalmers 84-in. by 24-in., operated by 60-hp. Allis-Chalmers motors; two rotary Allis-Chalmers 60-in. by 24-in., operated by 100-hp. Allis-Chalmers motors; two Vibrex 48-in. by 60-in., operated by 2-hp. Allis-Chalmers motors; and two Allis-Chalmers 36-in. by 60-in., operated by 30-hp. Allis-Chalmers motors.

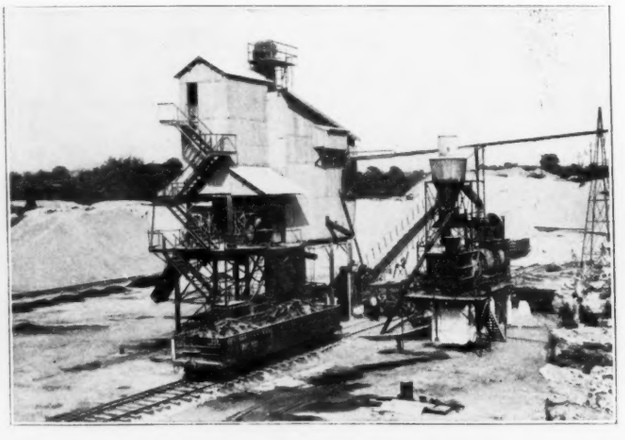
An Allis-Chalmers washing plant is in service at Plant B. It is 60-in. in diameter and 20-ft. long, and has a capacity of about 100 tons per hour. It is operated by a 100-hp. Allis-Chalmers motor. Stone is fed to this plant from the primary screens, ranging in size from 2½-in. to dust.

At Plant X a washing plant is in service, designed by the local machinery staff and installed by the company's own workmen. The same Allis-Chalmers liners are used as are in the washer at Plant B and, in other respects, this washer is practically the same as the one installed at Plant B, except that it is 28-ft. long. It has about the same capacity. It is operated by a 100-hp. Allis-Chalmers motor.

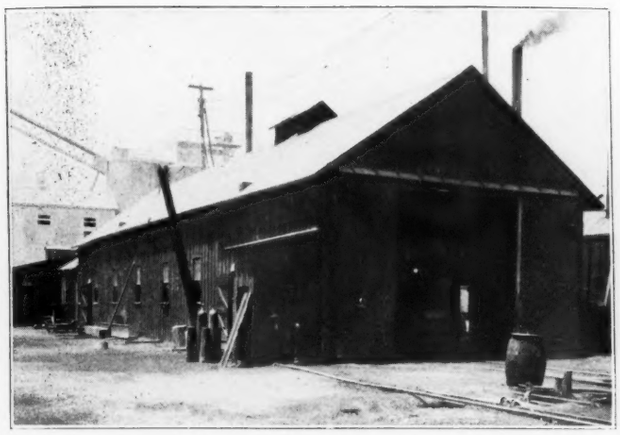
The storage capacity at both plants is limited to the receiving bins which have a capacity of about 50 tons at each plant. This capacity has been found entirely sufficient because of the steady de-



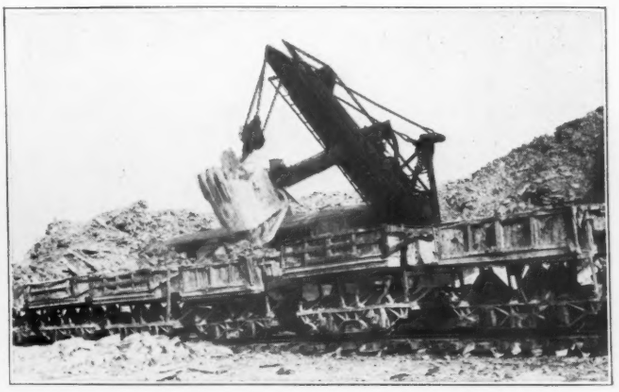
Steam locomotive for switching around quarries and crushing plants



Asphalt plant



Machine shop



Two makes of side-dump cars in Scioto quarry being loaded by steam shovel

mand for the material, which keeps it going out by railroad and truck as fast as it is produced.

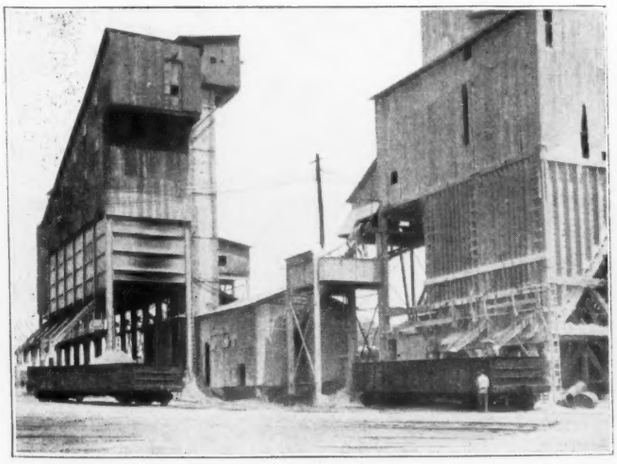
In connection with this plant, a modern machine shop, and car-repair and locomotive-repair shop are operated under the direction of E. H. Humberstone, master mechanic. The equipment consists of a 24-in. gap lathe, made by Rahn & Carpenter; an American 24-in. lathe made by Lodge & Shipley; an 11-in. gap lathe, made by the Artisan Manufacturing Company; a 24-in. Barker shaper; a 3-ft. by 10-ft. Gorton planer; two Barnes drill presses; a 2-in. Acme bolt cutter; a 42-in. Bullard boring mill; a 1¼-in. Mitts & Merrill slotter; a 6-in. by 16-in. Racine hack saw; a 48-in. punch-press made by the Covington Machinery Company; a 48-in. Peatty shear-press; and a 200-ton wheel-press. About 35 men are employed in these shops.

These plants produce crushed stone in a variety of products, including those used for flux in plate glass factories and steel mills, road stone, a variety of concrete work, agricultural limestone, dust in mines to prevent coal-dust explosion, and many other uses both in the raw state and after being specially treated. The company does not do any delivering, all material being sold at the plant. Two small Ford trucks are maintained for hauling supplies and running errands, and a Ford fire-truck is maintained.

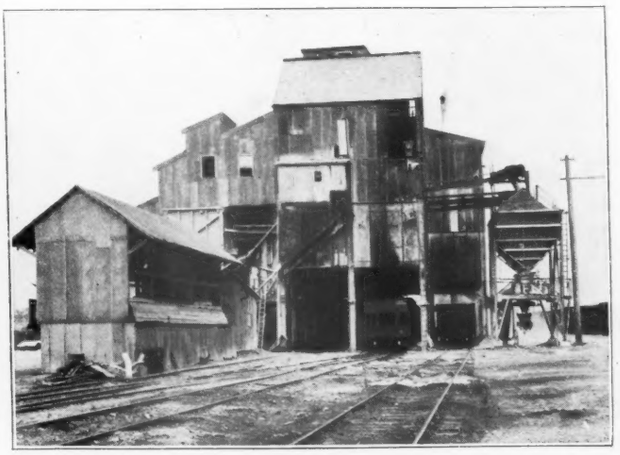
A ready market for this stone for use as flux is available in the plate glass factories and steel mills in Columbus and vicinity. While the size for this use varies to some extent, about 75 per cent of the amount sold for this purpose runs from 6 to 8 in. Besides supplying flux stone to local and nearby plate-glass and steel-mill plants, it is shipped to points in Kentucky, West Virginia and eastern Ohio. Stone for road and concrete work is used locally and is also shipped to points in West Virginia and western Pennsylvania.

About 90 per cent of the output of these plants is shipped by railroad. Most of the road stone is handled by truck and all of the flux is shipped by railroad. The road stone is sold to contractors, county officials, officials of the state highway department, and to township trustees. The total production last year was about 2,000,000 tons. Of this amount, about 15,000 tons was pulverized limestone, the balance being about equally divided between road and concrete stone and flux.

A considerable amount of agricultural limestone is produced by this concern, a modern pulverizing plant being operated in connection with the lime plant. For manufacturing this product, a Wil-



Crusher plant X and washing plant



Crusher plant B

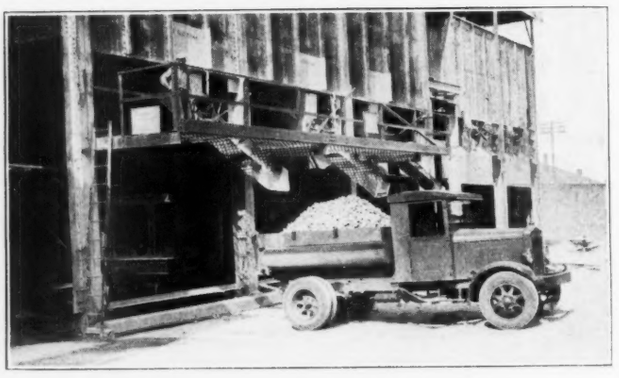
liams pulverizing mill, operated by a 100-hp. Allis-Chalmers motor; a Raymond pulverizer, operated by a 60-hp. Allis-Chalmers motor; a Jeffrey pulverizer, operated by a 100-hp. Allis-Chalmers motor; and a 7-in. by 48-in. ball mill, made by the Hardinge Company, and operated by a 150-hp. Allis-Chalmers motor, are used. The ball mill is a recent installation.

This pulverized limestone, for which there is a steadily increasing demand, is shipped to various points in Ohio, and to the adjoining states of Michigan, Indiana, Kentucky, West Virginia and Pennsylvania. A considerable amount is shipped direct to farmers, dealers, county agents, and co-operative marketing associations.

The demand for the crushed stone products of this company is affected to some extent by the seasons, the summer demands being heavier than the winter demands. No attempt has been made to increase the winter output. Some of the bigger construction contractors are beginning to do concrete work throughout the entire year, and this tendency has resulted in an increased demand for stone for winter concrete work. This seasonal tendency affects only Plant B, which produces road and concrete stone exclusively. This plant operates about eight months of each year. Plant X, on the other hand, which supplies flux stone in addition to road stone and other products, is able to operate the year round, because the demand for this product is practically the same throughout the entire year.

In connection with Plant B, an asphalt plant is operated. At this plant an original process has been developed by which the asphalt is mixed hot and delivered to the customer in such a condition that it can be laid cold without re-heating. This process, which has gone beyond the experimental stage, is meeting with much favor by city officials and contractors in the city of Columbus. It offers a decided advantage in the construction of new streets and the repair of old streets, in its economy of time and ease of application.

Mouth of primary crusher at plant X



Loading a truck from bin at plant B

The officials of this company consist of W. H. Hoagland, president; Harold J. Kaufman, general manager; Russel Rarey, vice-president and sales manager; R. H. Pausch, secretary-treasurer; H. R. Welch, general superintendent; and E. E. Tinkham, chief clerk.

Canadian Production Increased $30,000,000 in 1928

Canada's production of non-metallic minerals and their products in 1928 reached a value of $206,016,596, an increase of approximately $30,000,000 over that of the corresponding period of the previous year, which had a total production value of $175,732,594. Capital invested in the industry amounted in value to $290,466,839, and a total of 1,169 plants were engaged in operations.

Cement production in the period under review totalled $16,583,703 as compared with a production value of $14,391,937 in the previous year. During the year 11 plants were in operation as against 12 in the previous year.

Output of *lime* in the year had a value of $4,472,780 as against $3,923,388 in 1927. The production of lime has shown a steady increase since 1924 when $3,178,541 was produced.

Production of *sand-lime bricks* during the twelve months under review had a value of $1,060,143, which established a new high record for the past five years. This compares with $939,911 in 1927 and $619,946 in 1924. Eleven plants were in operation in both 1928 and 1927, while in 1924 there were 12 operated.

Production of *asbestos* and allied manufactures were valued at $2,050,432 as compared with $1,663,300 in 1927. Asbestos cement products were produced to the value of $4,175,973 as against $2,663,065 and $1,257,871 in 1927 and 1924 respectively.

Shipments of *gypsum* from Canadian deposits in 1928 totalled 1,246,368 tons with a value of $3,732,648, which established a new high record.

Latest Ideas in Stone Crushing Are Incorporated In Plant at Harrisburg, Pa.

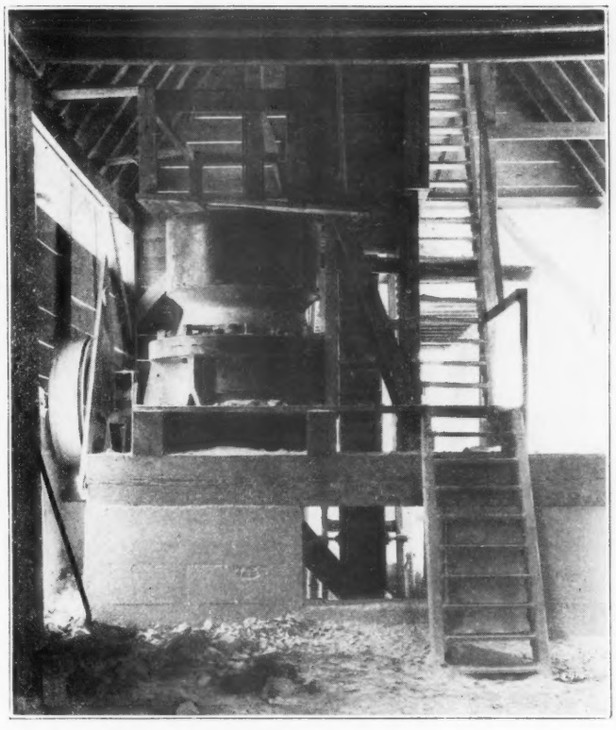
Hoffman Brothers & Wilson Prepare For Consistent Expansion

By A. R. AMOS, Jr.

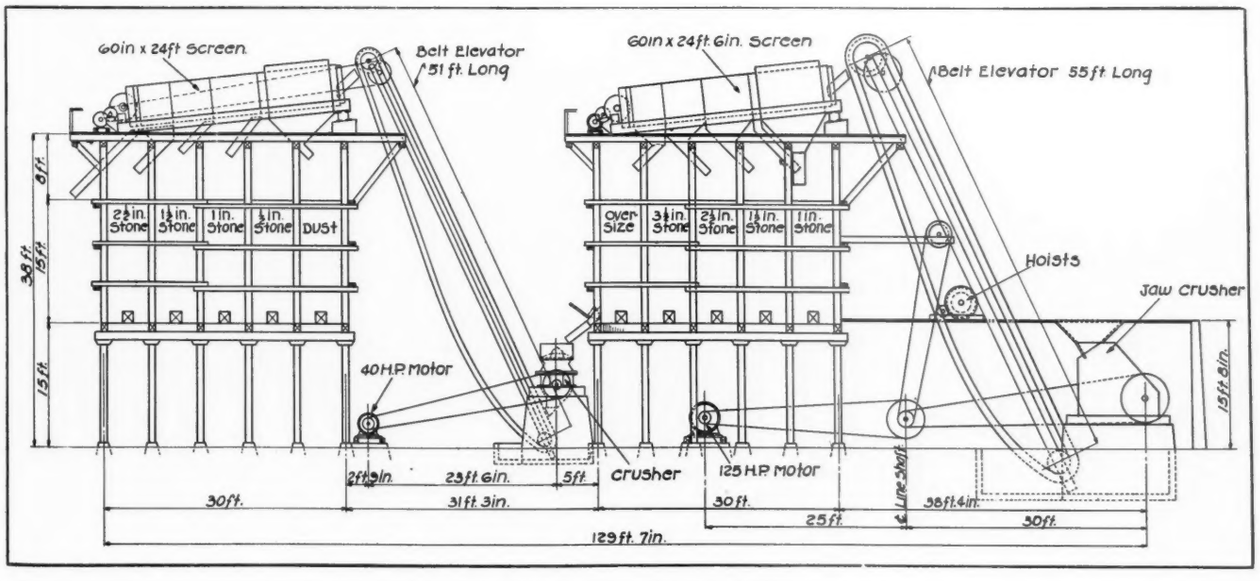
POSSESSING one of the best commercial stone quarries in central Pennsylvania, Hoffman Brothers & Wilson of Harrisburg determined to install a comparable crushing plant, in order to meet the requirements of an increasing market at the lowest consistent production cost. The old plant had been in existence for many years and, rather than invite the many undesirable features incident to remodeling of any old outfit, the owners made the commendable decision to erect a complete new plant, incorporating every feature best adapted for efficient service. After a survey of a number of eastern crushed-stone plants, the Smith Engineering Works was selected to design the plant and furnish most of the machinery required.

Located about a mile from the center of the Capital city of Pennsylvania, a large volume of trucking deliveries is inevitable. This condition involved special provisions for loading numerous trucks quickly, without confusion or delay. Also, located on the main line of the Reading Railroad, ample car-loading arrangements were important.

To supply these facilities on a long, narrow plot of ground between a siding and a truck road, and to provide separate storage for a number of stone grades, a double-bin straight-line type of plant was selected instead of the more conventional straight-line type with a separate scalping plant. Favorable to the selected layout is the tendency of the rock to break relatively small and in cubical form,



Reduction crusher and elevator



Sketch elevation, Hoffman Bros. and Wilson plant

Truck-loading side of bins. Railroad track is on opposite side

permitting the economical use of a primary jaw crusher capable of close discharge setting.

The plant structure consists of two wooden bins each 30 ft. long by 18 ft. wide and 15 ft. high, carried by steel eye-beams on reinforced concrete piers with a quarry-car dumping platform carried forward on bents from the primary bin. Each bin is divided by partitions into five sections so that, if desired, as many as ten different grades of product may be carried on hand, with a total capacity of 800 tons.

An additional 600 tons of storage is available in the auxiliary bins located over the batchers. Crushers and elevators are located at the front end of each bin and the sizing screens are carried on decks above, thus giving a substantial reserve supply of stone without stock piling. Side gates with hinged chutes deliver the material from all sections to the railroad cars on one side, and to trucks on the other. Siding rails are filled in with planks and stone so that if cars are not being loaded, trucks may be loaded on either side. Center truck-loading also may be employed under a secondary bin, if found necessary in the future.

Capacity is 600 tons per day with the present equipment, but provision is made to increase to 800 tons by merely inserting a 10-in. gyratory crusher alongside the present No. 40 reduction crusher. A still further increase to 1,000 tons per day may be made by installing larger jaw crusher, scalper and conveyor units and without the usual necessity of increasing original units.

Quarry Practices

The quarry is well opened, from years of opera-

View of Hoffman Bros. & Wilson plant from the quarry

tion, and has a breast 100 ft. high and 1,500 ft. long, in the form of a semi-circle. It is a dense limestone formation, typical of the Lebanon Valley section, free from dirt pockets, and provides a clean, hard material that is ideal for concrete aggregate, macadam, asphalt work, or cement blocks. The quarry is kept dry by Cameron single-stage centrifugal pumps drawing from a sump at the foot of the incline. Well drills are employed to sink holes for blasting; and the secondary shooting is done in jackhamer holes with air supplied by an Ingersoll-Rand compressor.

The overburden, which averages about 4 ft. in thickness, is removed by an Erie type B steam shovel and is loaded into auto trucks for haulage to fill-jobs or waste.

Erie type B ¾-cu. yd. steam shovels also load the blasted stone into locally-made 3-cu. yd. side-dump cars running on a 30-in.-gauge track system. Cars are drawn up a double incline-track by two Orr and Sembower high-speed electric hoists, and are emptied into a hopper above the primary crusher. The double-track system maintains a constant supply to the Farrel type 15-B jaw crusher, with 24-in. by 36-in. receiving opening driven by a 100-hp. General Electric motor with drum controller. The deep frame of the crusher permits a 3-in. discharge setting at which 50 per cent of the product screens out in the first four bin sections. The tailings go to the fifth section and may be either chuted to the secondary crusher or drawn off into trucks. This section functions also as a surge bin, insuring steady feed to the reduction crusher.

The 55-ft.-centers belt elevator from the primary crusher is a Telsmith No. 9 with No. 8-gauge buckets, 30-in. by 16-in., and is supplied with a heavy steel-channel frame to insure permanent alignment of all parts. The elevator discharges, through a specially designed hopper-type chute, to a 60-in. by 24-ft. Telsmith-Hercules stone screen, equipped with an 8-ft. plate jacket perforated with ¼-in. round holes. The main-barrel hole sizes are ¾-in., 1½-in., 2-in., and 2¾-in.

Of particular interest in the screen design, are the Timken roller bearings, a screen frame of heavy 14-in. eye-beams insuring permanent alignment; and the screen sections clamped together, avoiding the tedious fitting that is necessary with the old bolted types. The rib sections are clamped to longitudinal angles, avoiding any weakening incident to the usual drilled provision for connection. The screen and the elevator are driven from a 40-hp. Wagner motor through reduction gears.

The last bin section of the primary unit contains minus-2¾-in. and tailings, both of which are

Primary jaw crusher and elevator

fed normally to a No. 40 Telsmith gyratory reduction crusher, driven by a 50-hp., 1,150-rpm. Westinghouse squirrel-cage motor. This crusher is usually set at about 1⅜-in. and produces about 45 tons per hour, all passing 2-in. round openings. When set at ⅞-in., the crusher produces about 35 tons per hour of which about 90 per cent passes 1-in. holes. The reduction crusher (also the 10-in. gyratory, when installed) discharges into a Telsmith No. 6 steel-frame belt elevator 59 ft. long, center to center, which delivers the product to a second 60-in. diameter by 24-ft. long Hercules rotary screen. This screen has an 8-ft. plate jacket with 3/16-in. perforations, delivering high-grade limestone dust that is in demand by block plants and other discriminating buyers. The main barrel is provided with ⅝-in., 1⅛-in., 1⅜-in., and 1¾-in. round-hole sections. Space is allowed to insert a vibrating screen in the future, whenever further classification of sizes between ⅝-in. and 1⅛-in. becomes necessary.

Delivery to trucks is by Telsmith 16-in. by 18-in. Siquad bin gates with hinged loading chutes having counterweight control. This type of gate shuts down on material and stops flow quickly.

The construction of this plant was started January 8, 1929, and was completed April 10 of this year—a creditable showing for promptness under wintry conditions. Work was under the personal direction of W. E. Wilson and George Hoffman—principals of Hoffman Brothers & Wilson—with A. R. Ebersol as erecting engineer.

Diesel Engines—Their Present and Possible Applications in the Pit and Quarry Industries—II

Discussing, Describing and Illustrating Applications of Oil Engines and Pointing to Opportunities for Saving by the Use of This Power

By J. O. DURKEE

IN THE first of this series of articles published on page 67, September 11, 1929, issue of PIT AND QUARRY, an effort was made to describe a number of different types of diesel engines. These descriptions were of the engines built by those manufacturers which were sufficiently interested in getting the information to the operators of pits and quarries to cooperate. Most of that installment was compiled from information supplied by their engineers and given to assist the field in deciding upon those engines most adapted to the work contemplated.

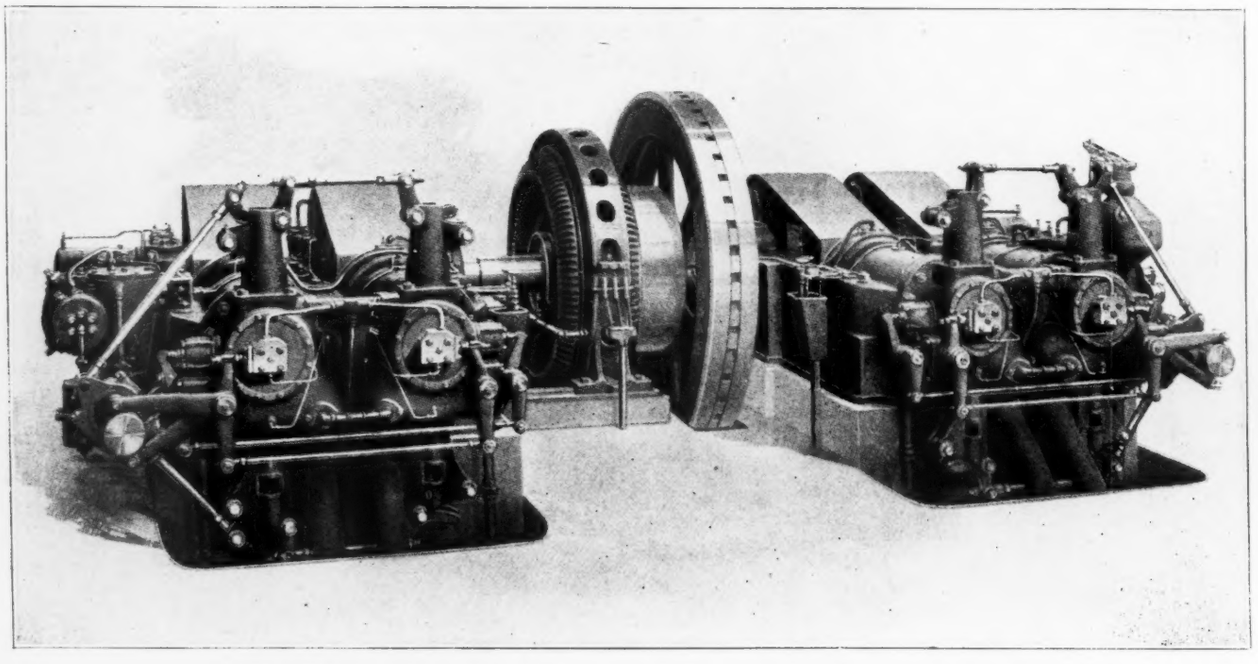
This second of the series is largely from similar sources, except we have taken the liberty to search other publications and consult manufacturers of machinery in order to give a composite view of diesel-driven machinery. In some instances, we have not been circumscribed entirely by the boundaries of our field, when we felt an illustration from a closely allied field would serve the purpose of interesting our engineers in studying the elimination of certain overhead costs in the application of prime movers to pits and quarries.

Central Power Plants

One of the problems of pits and quarries is the reduction of fixed charges, which is difficult in any industry so much inclined to seasonable operation as well as enforced part-time operation as is the case of pits and quarries. Purchasing power is considerably more expensive than a properly installed diesel plant, even if pits and quarries operated 300 days per year; but, as is the case in these industries, when weather conditions enforce three months of non-production and lack of orders another two to three months, the "minimum charge" or "power demand" considerably widens the differential between purchased power and diesel-operated power plants and gives the latter a more general preference when costs are calculated. Because of this, the diesel-operated plant is continually gaining favor and will continue as its possibilities become more apparent.

Two of the most successful applications of diesel engines to pits and quarries are the electric generator set and the compressed air plant. The most successful in large plants is to have a diesel-operated generator set for producing power to operate motors on crushers, screens, washers, conveyors and other machinery in the plant and a diesel-driven compressor for producing compressed air to operate pneumatic drills, drill sharpeners and other quarry and shop equipment.

A common application to generating sets, according to C. H. Gibbons in the August *Mechanical Engineering*, is the so-called "Western Union" gen-



Allis-Chalmers twin duplex direct-connected to an Allis-Chalmers generator

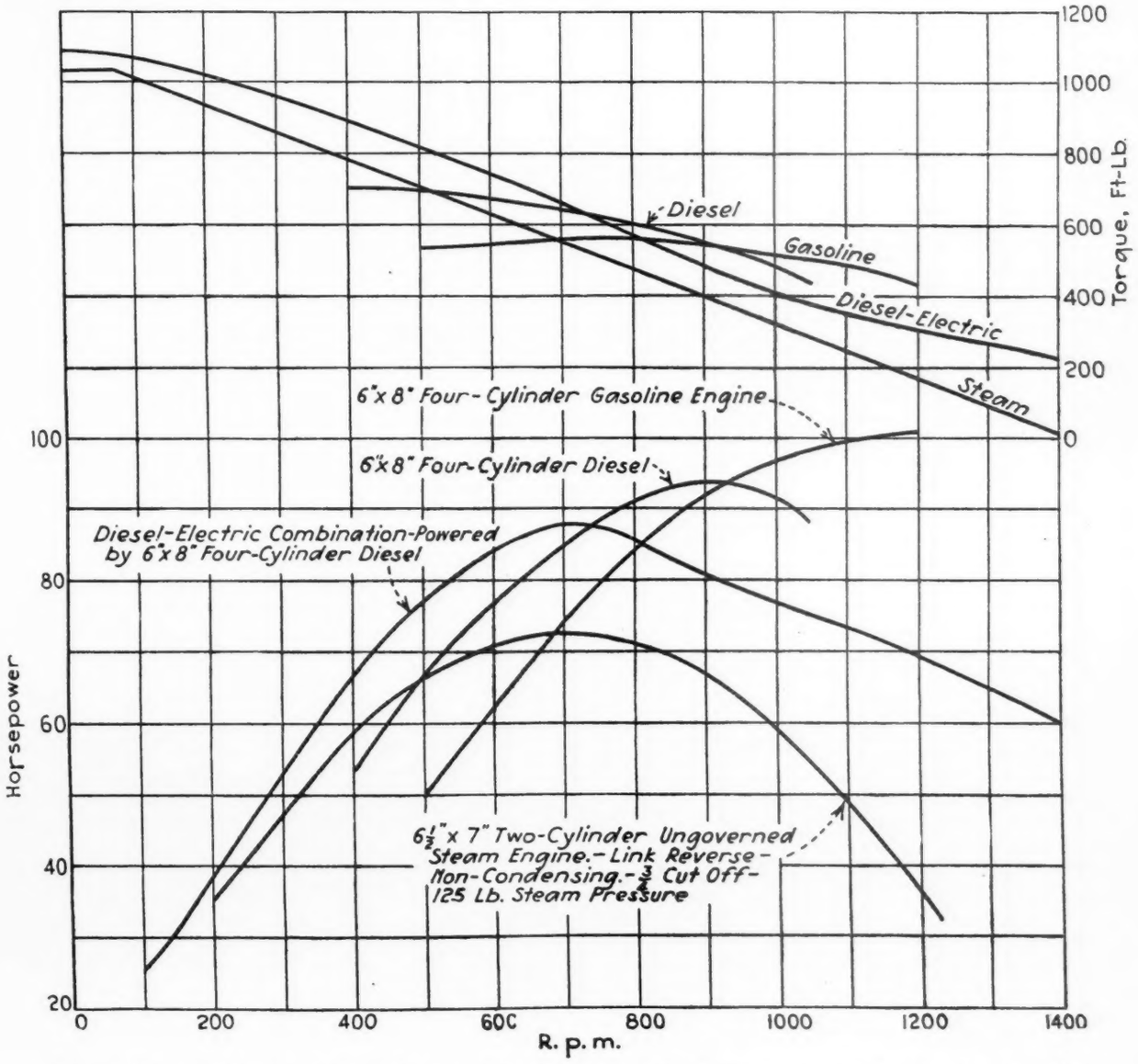
erating set, so named because it was developed to meet the need of Western Union buildings for a slf-contained generating unit for use in various localities where by city ordinance the use of a gasoline engine in the basement of a building is prohibited. They are usually employed as stand-by units and have definite advantages also of small floor space and small head room. For example, a 100-kw. set needs a floor space of 42-in. by 165-in. and a head room of less than 90 in. over the radiator.

"Another application consists of a 4-cylinder, 6-in. by 8-in. diesel, direct-connected to 65-kw., 900-r.p.m., 250-volt d.c. generator. The demand on this generator varies widely from very small currents up to 300 amperes. Service is 24 hours, 6 days per week, and the unit has been in service for two or three years. The cost of fuel and lubricating oil is as low as one-half cent per kw.-hr. when using the lower grades of fuel oil. The floor space required is 5 ft. by 10 ft.

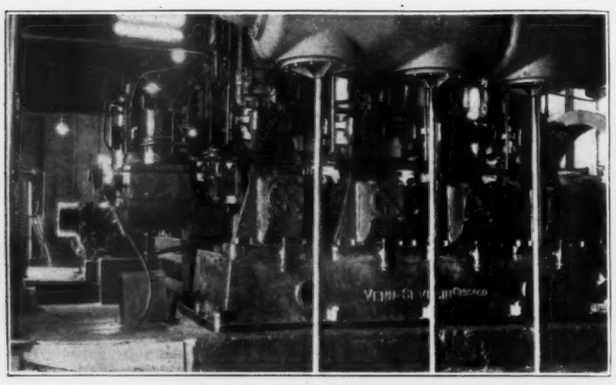
"An application in this field of a high-speed diesel generating set is that of the Zipprich Teaming Company of Chicago which has a 2-cylinder, 6-in. by 6½-in. diesel direct-connected to an 18-kw., 125-volt d.c. generator. This equipment with accessories occupies a space of 8 ft. by 10 ft. in a basement whose head room is only 86 in., yet there is ample room for removal of pistons, etc.

"The operating record for the first 66 days showed fuel and lubricating costs of one and a half cents per kw.-hr. On the basis of these results a net saving annually on six 5-ton and one 1½-ton electric trucks will be $1,885. An interesting phase of this installation is the use of the heat of the exhaust gases to heat water for car washing, etc., about the garage.

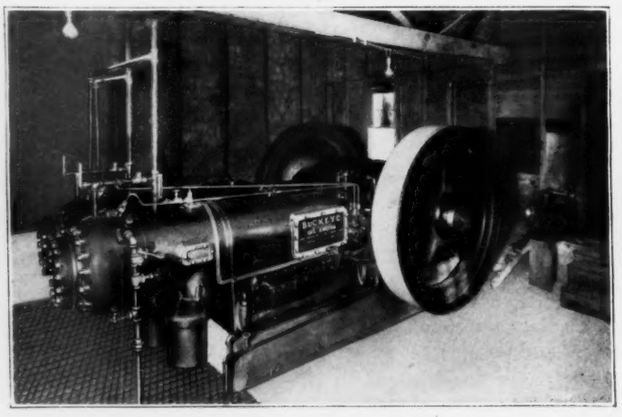
"An interesting application is that of a high-



Comparative speed-torque and speed-power characteristics of diesel gasoline, diesel-electric and steam-driven excavating machines From August *Mechanical Engineering*, page 577.



Ven-Severin and Fairbanks-Morse engines each driving generator in Michigan lime plant



Buckeye 190-hp. engine operates Long Stone Company plant

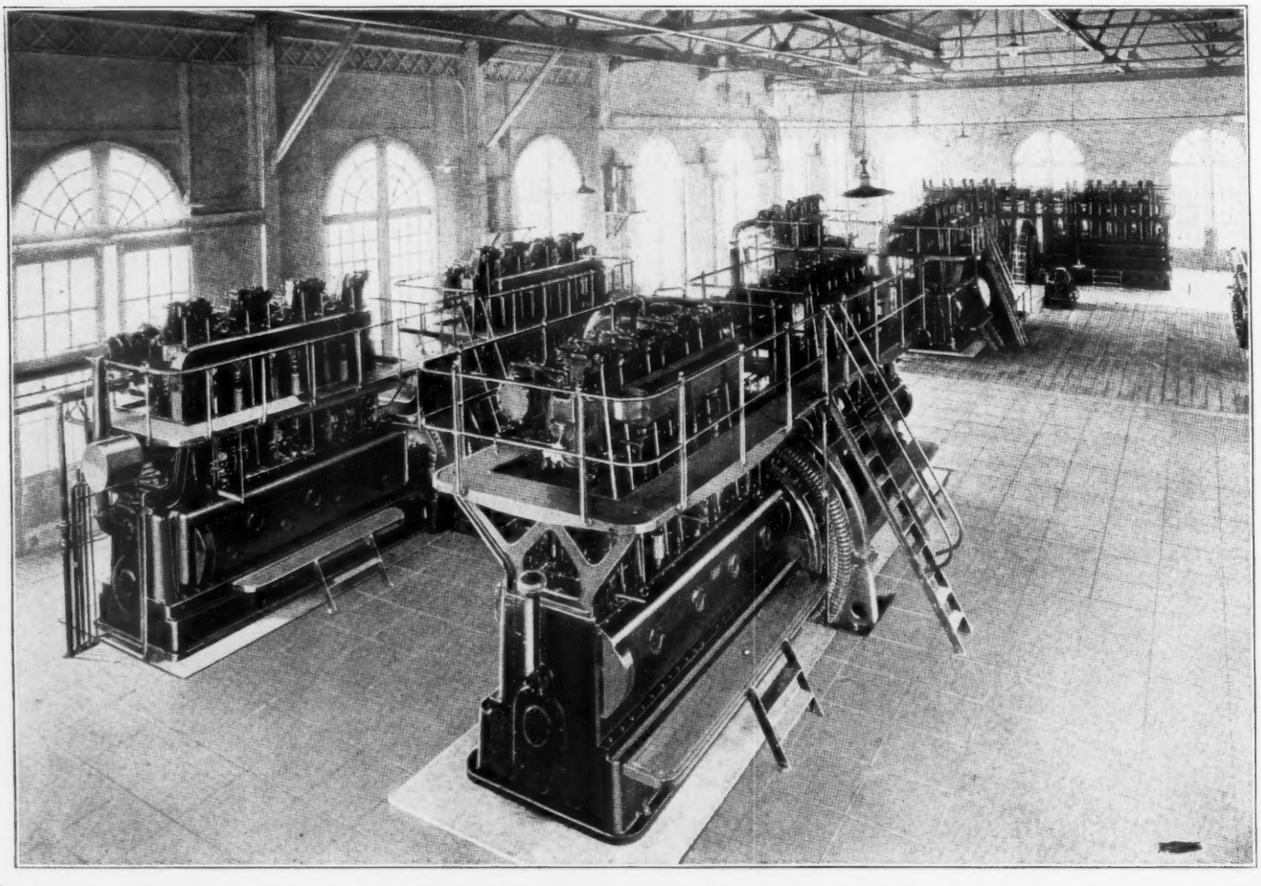
speed diesel to a portable air compressor. A prominent compressor company has had one of these in commercial service for several months. It is a 320-cu. ft. compressor powered by a 92-hp., 4-cylinder, 6-in. by 8-in., 1,000-r.p.m. diesel. The company, however, is operating it at 850 r.p.m.

"An interesting application of a high-speed diesel consists of a 92-hp., 1,000-r.p.m. diesel, 4-cylinder, 6-in. by 8-in., belted to a 16-in. by 10-in. by 14-in. air compressor, delivering 400 cu. ft. of free air per minute against 130 lb. pressure. The fuel oil used is 28 to 30 deg. B., and the fuel consumption varies from 0.4 to 0.45 lb. per b.hp.-hr."

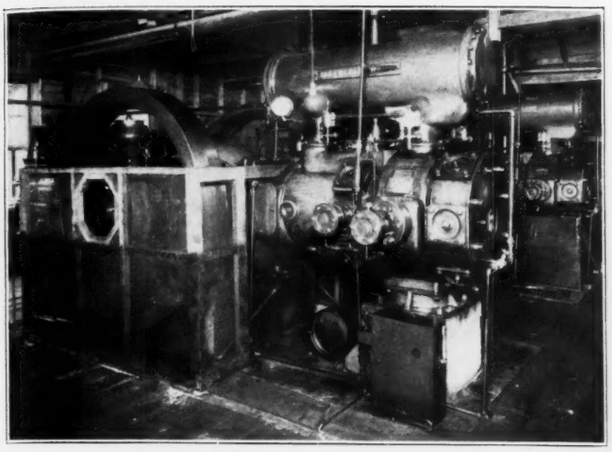
The many illustrations in the September 11 issue of PIT AND QUARRY and those included in this installment are sufficient to point the way for investigators. They will find the opportunities for applying diesel engines to the manufacture of power are almost everywhere present in this field. Manufacturers have experienced men as well as unlimited literature that are available, and a careful use of these will undoubtedly result in considerable saving at a large number of plants.

Diesel Power Proves Saving In Stone Quarry

An interesting result of an installation of a diesel engine in a stone quarry is brought to our attention by the Long Stone Company, with quar-



Ingersoll-Rand engines operating 5,000-b.hp. plant of the San Antonio Portland Cement Company



Two Ingersoll-Rand diesel-operated air compressors

ries at Lima, Ohio. After the new type of power was in operation, it was found that the previous cost of $0.081 per ton had been lowered to $0.0493.

Before the diesel installation, an 80-hp. steam engine was used.

Equipment used by this Lima company is as follows: One No. 5 Gates gyratory crusher, one No. 3 Gates gyratory crusher, one No. 3 McCully gyratory crusher, one 3-ft. Symons cone crusher, one Allis-Chalmers elevator and elevator screener, one 5-in. and one 6-in. pump for water, one 190-hp. Buckeye diesel engine, one No. 29 Osgood steam shovel, one 4-ton Whitcomb locomotive, and 1½-yd. Nelson loader on Fordson tractor, cement block plant, automatic anchor outfit, have 10,000-ton stock pile, and 7 bins with 1000-ton capacity in the plant.

Plant of Long Stone Company

View of Lewanee Sand and Gravel plant, Tecumseh, Mich. Operated by diesel power

Anderson 180-hp. engine driving gravel pump of Lewanee Sand and Gravel Co.

Water was pumped in the morning which made imperative a 60-hp. load for two hours a day. Costs on the steam engine for 1927 were: Coal, $2,440; engineer and hauling coal, $1,418; engineer at $6 per day, making a total of $3,858.35, or $0.081 per ton power cost.

In addition to the equipment mentioned above, a 3-ft. Symons cone crusher was added at the same time that a diesel engine was placed in operation. This imposed about 75 hp. to the former load. Yet, regardless of this, the following saving was shown: Fuel oil at 8c per gallon delivered, $873.46; lubricating oil at 51c per gallon delivered, $84; repairs, $15.25; engineer, $770.50 (at $5 instead of $6 a day), making a total cost per ton of $0.049.

A particularly interesting note regarding this installation is that, while the load was increased almost double, the cost of power was decreased from $0.091 per ton to $0.049, which is a saving of nearly 50 per cent.

With the start of the 1929 season, the confidence of the Long Stone Quarry in diesel power was so great that an engineer was not employed, resulting in a further reduction in costs of $5 a day. It was found that an hourly call was sufficient to check up on water circulation and general conditions.

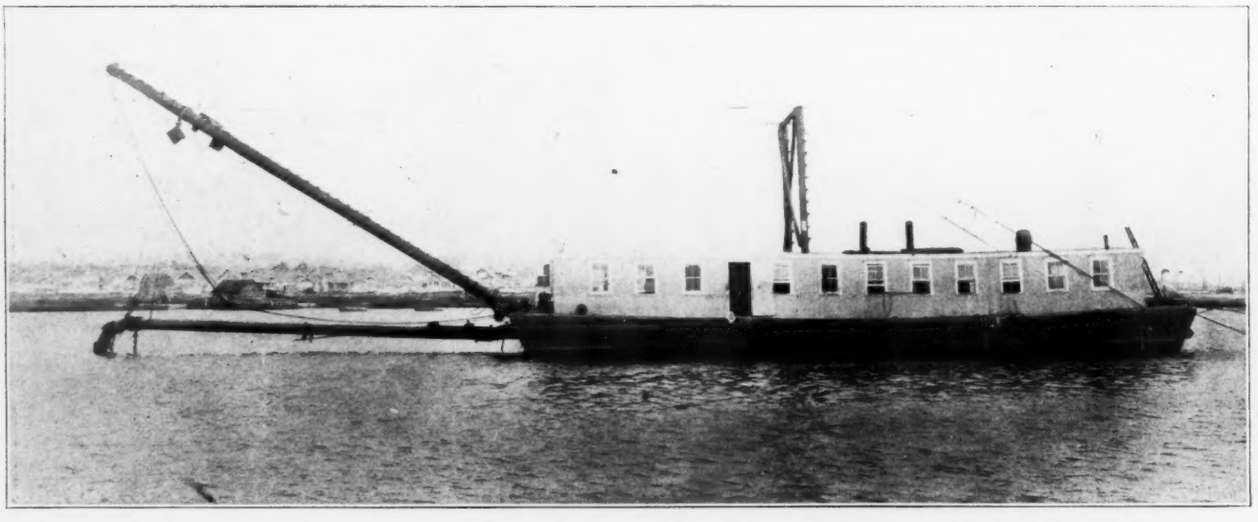
Amos Long, proprietor of the Long Stone Quarry, when interviewed, said that his attention was first called to diesel power by the success others in his district were enjoying because of the economical and reliable operation of this type of power. Mr. Long heartily endorses the use of diesel power because of the ease of operation and lack of the need for constant attention which is found in other types of power.

The diesel engine used at the Long Stone quarry is a 190-hp. Buckeye, manufactured by the Buckeye Machine Company. The accompanying photograph gives a good idea of this engine, which has proved so satisfactory, not only at the Long Stone Quarry, but in other quarries.

Diesel-Equipped Hydraulic Dredges

The Diesel has a marked place in the operation of hydraulic dredges as is indicated by the numerous installations during recent months. This is due to the many general advantages obtained: The high cost of laying power transmission lines from central station electric plants to a remote sand and gravel hydraulic dredging operation; the "demand charge" over the months of idleness, during the winter season and periods of depression; the ease by which fuel may be obtained; and the low costs of fuel and supervision.

According to Geo. B. Massey on pages 90 and 91 of the August 28, 1929, issue of PIT AND QUARRY, "The development in hydraulic dredges during recent months has consisted of the improvements in centrifugal pumps, the increased application of diesel engines and the adaptation of the dredge



Dredge of Hill Dredging Company, equipped with 325-hp. 6-cylinder type "K" Anderson engine driving sand pump.

to the work so as to take advantage of the desirable features and avoid the undesirable features of the hydraulic type of dredge.

"On a diesel engine dredge, it is, of course, impracticable to have a diesel engine direct-connected to each unit.

"The alternatives are: (in the order of their first cost):

(a) To drive a generator with the diesel engine, with motors on all units.

(b) To drive the main pump by a diesel engine direct-connected and have an auxiliary diesel engine driving a generator supplying current for all auxiliaries.

(c) To drive the main pump with a direct-connected diesel engine which also drives a generator supplying current for the motors on all of the auxiliary units.

(d) To drive the main pump with a diesel engine direct-connected and also drive a countershaft through a speed reducing mechanism. The countershaft delivering power to all auxiliaries by some type of gearing, usually belting.

"In the last two cases, it is desirable to be able to run the auxiliaries without the main pump and some sort of a clutch becomes necessary between the diesel engine and the main pump. In the range of horsepowers used on hydraulic dredges for running the main pump, a large and heavy clutch would be necessary."

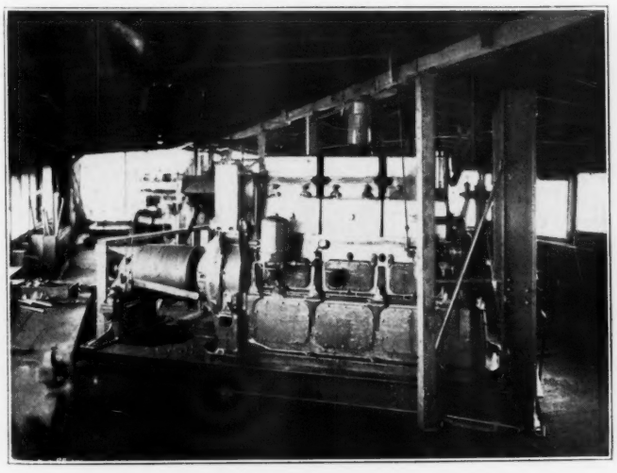
The following data was compiled by the A. C. Nielsen Company, a firm of engineers, whose work is to investigate, analyze and report on the actual performance and use of methods, machinery, and materials, thus providing unbiased performance data for the guidance of the purchasers. This should be extremely interesting to all operators of dredge pumps and sand and gravel pumps, as it shows the possibilities in reducing power costs and increasing the early profits, by the proper application of the light-weight, high-speed diesel engine.

It is believed that this is the first application of a high-speed diesel engine to dredge pump service, although, since Mr. Keg's installation was made, others have equipped their dredges with similar power.

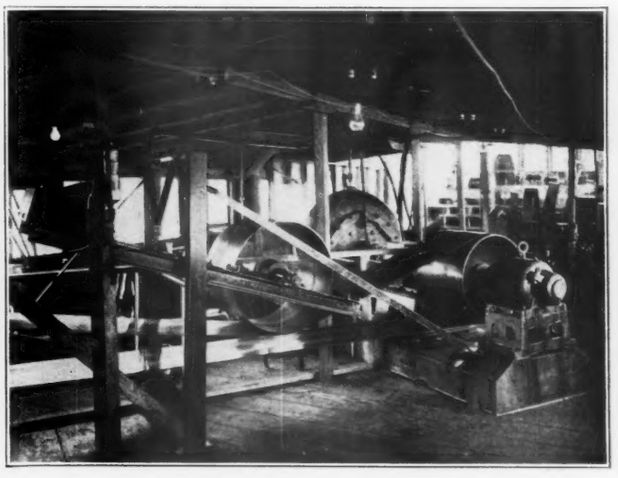
View of plant of Schellburg Sand and Gravel Co. showing dredge boat where a 120-hp. 4-cylinder Buda engine drives an 8-in. dredge pump

Of particular interest is the absolute lack of vibration in the hull of the dredge when operating with the Buda-M.A.N. diesel engine, under any load condition. This was one of the bad features of the steam power, formerly used.

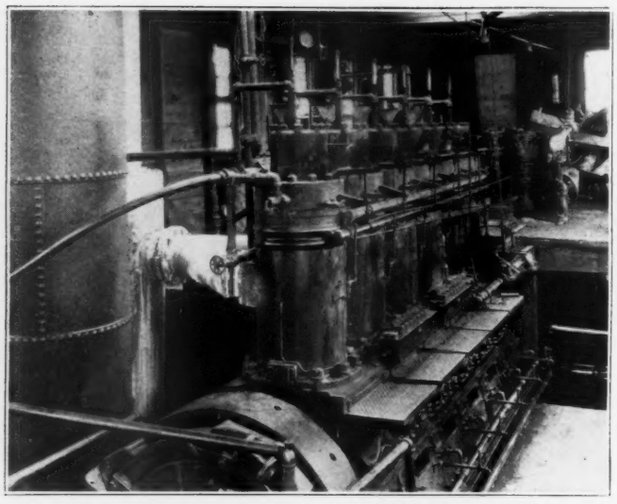
At the time the diesel engine was installed, all of the old machinery and the superstructure was removed, leaving only a bare hull, which was constructed with a frame work of 6-in. by 8-in. timbers with 3-in. bottom planking, 6-in. end planking and 6-in. and 4-in. side planking. The size of the hull is 75 ft. by 20 ft. by 5 ft. Since the hull had been subjected to considerable strain by the use of former steam power, it was strengthened by 6-in. channels placed back to back and extending transversely on the bottom. At the sides of the hull, vertical structural members were bolted to the side of the hull and connected to the channels on the bottom of the hull by means of a gusset or knee of



Looking forward in dredge. Julius Keg installation



Belt drive and idler. Julius Keg installation



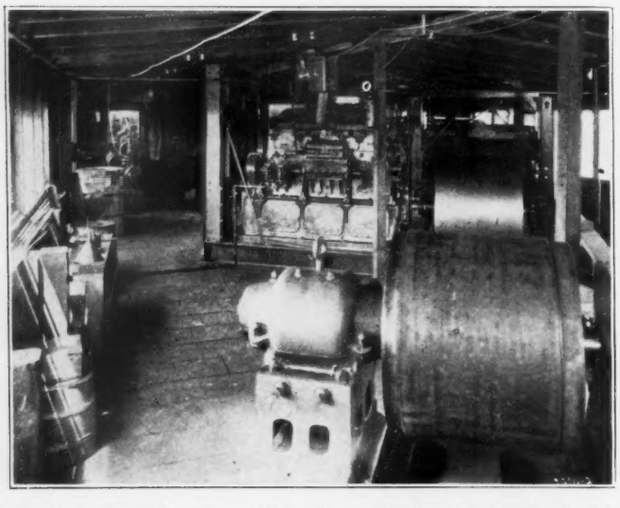
Anderson type "R" on dredge of Hill Dredging Co., Atlantic City, N. J.

steel plate. On top of the transverse beams were placed longitudinal H beams spaced 3 ft. apart, and on these H beams the structural base of the engine and the pump base were mounted.

Referring to the cut showing the interior of the dredge, you will note that the engine and pump center line are not at right angles with the center line of the dredge. This method was adopted to secure proper rotation of the pump without changing the suction or discharge and to secure proper trim of the load in the hull. Installing the engine in this manner also facilitates the connection of suction and discharge lines. The present arrangement permits ample working space around the engine and pump and cuts illustrate the amount of available working space.

Lighting is taken care of by means of a 1½-kw. gasoline-driven generator set. This provides light at all times, even though the main engine or cutter head engine is not in operation.

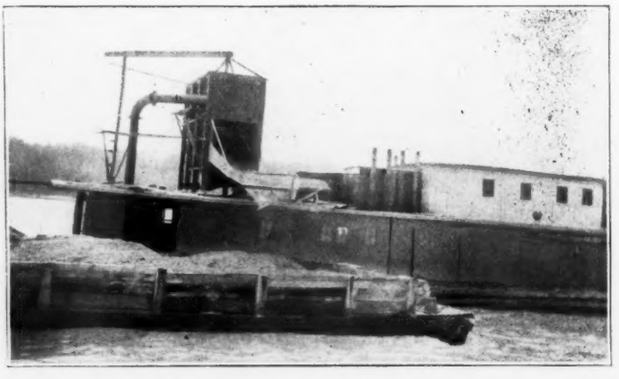
Priming is taken care of by means of a Morris, 2½-in. pump, which is driven from the shaft supplying power to the cutter head. Priming is by means of a Penberthy ejector, operated from the above pump. Power for this pump and the cutter head and hoist is supplied by a 40-hp. gasoline engine, which was used in connection with the former equipment.



Looking toward stern of dredge, showing Buda M. A. N. engine and belt drive

A 2-in. service pump, driven from a pulley on the diesel engine, supplies water to the pump bearings and for servicing. A line from this pump also extends to the cutter head bearings. You will note that a flap valve is placed in the discharge line close to the 10-in. American manganese pump.

Pressure and vacuum gauges are placed in a convenient position, so that the operator can see them at all times. A line has been run from the diesel engine to the operating station showing oil pressure on the lubricating system at all times. Cable controls have been extended to the operating position so that the diesel engine speed may be increased or decreased to suit the conditions of operation without the necessity of walking back to the engine.



Diesel-equipped dredge of Tenn.-Ark. Gravel Company

Power take-off from the engine is by means of a twin disc clutch, totally enclosed with an extension shaft supported by a Timken outboard roller bearing. Drive pulley on the engine is a Rockwood Paper Type. The clutch can also be handled from the operating position. One man only is required on the dredge for each shift and the entire equipment is under control from his station at the front end of the dredge.

The engine pulley is 18-in. diameter by 22-in. face. The belt is two-ply endless leather with a center distance of 13 ft. Idler pulley, which may be seen in an illustration, is used to maintain proper tension on the belt.

Starting equipment for the diesel engine consists of a small air-cooled, two-cylinder, opposed type gasoline engine, mounted directly on the flywheel housing and starting the main diesel through a special type of Bendix drive. Compressed air is not required for any purpose on this dredge.

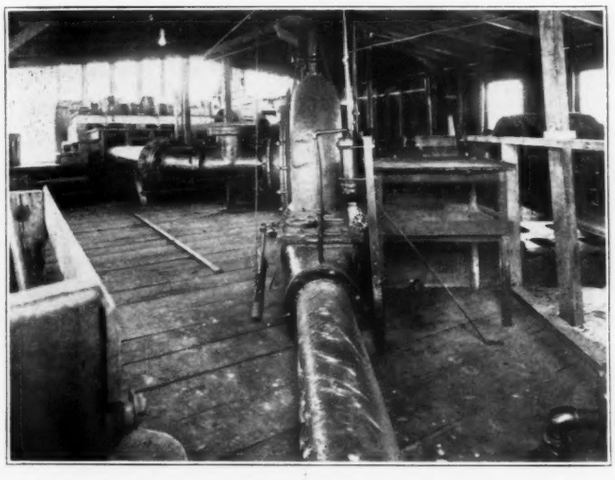
The power unit weighs, complete, 12,700 lb. The overall length, from the radiator to the end of

the power take-off shaft is 138 in. The overall width is 49 in. Height over radiator filler cap is 89¼ in. Silencing of exhaust is handled by a Maxim silencer.

The main engine is provided with lubricating oil filters, reservoir, and cooler, mounted on the engine. All of the intake air is filtered, preventing the entrance of dust or abrasive matter to the cylinder walls or bearings. Fuel is also filtered through a screen filter of very fine mesh.

The first run of this engine covered a period of 26 days, in which time the dredge operated on an average of 9¼ hours per day. During this period approximately 20,000 yd. of material was handled, which ranged from black dirt to sand and gravel. The principal part of this work consisted of removing an island, to form a motor boat harbor. For several months this engine has been operating on a 20-hour per day schedule.

It is interesting to note that when this engine was transported from the factory to the job, it



Buda M. A. N. engine driving 10-in. Amsco pump

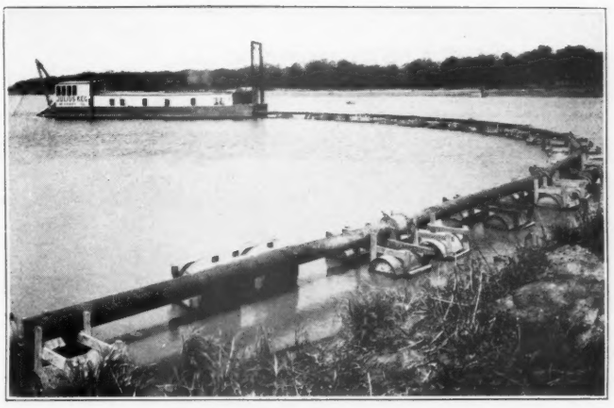
was handled on a truck and shipped completely assembled, eliminating necessity of rebuilding or aligning the unit after installation. It was merely necessary to install it on the foundation beams and bolt it down and to make connections for the exhaust line and the fuel lines.

The following figures, giving in detail operating costs, are very striking. Mr. Keg expresses himself as extremely well pleased with the results obtained by his change to diesel power.

Comparative Operating Costs of Power Units

The steam engine was purchased for $250 and cost $60 for trucking and $48 for labor to bring to the shore. About $1,000 was spent for boiler, foundation material, feed water pumps and complete installation, making a total of $1,358.00.

The first cost of the Buda diesel engine is $12,140 plus $45 for trucking and approximately $75



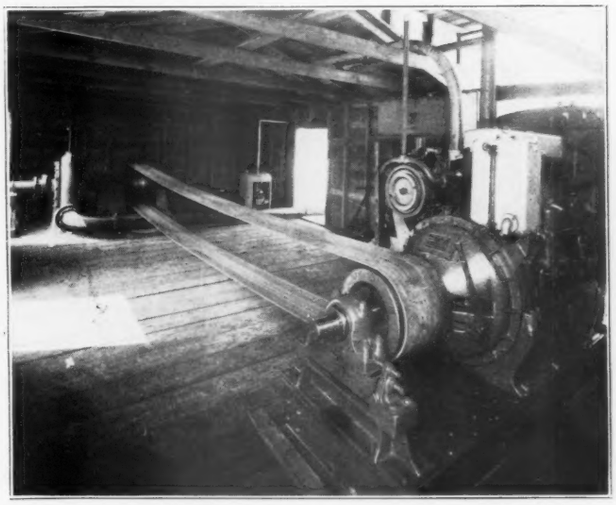
Julius Keg dredge, equipped with a 180-hp. Buda engine

for installation. Fuel oil tanks cost about $300, making a total of $12,560.

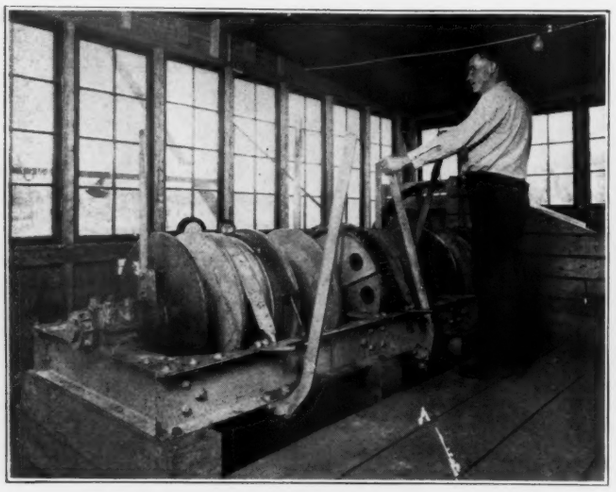
In Table A are set up the fixed operating costs for both the steam and diesel power units. Depreciation and average interest are based upon a life of 10 years, although it is thought that both the steam and diesel engines might be expected to serve for far more than that period, particularly on an operation of this type. No record exists on repair and maintenance costs on the old equipment, but it is estimated that not less than $800 was spent per year. The diesel engine has not been in service long enough to show any repair costs and an allowance of 2½ per cent, or $250, is made. The total fixed charges are thus $980.61 for the steam unit and $1,920.48 for the diesel unit. These correspond to costs per shift worked of $4.71 and $4.62 respectively.

Operating costs per shift are made up of the above fixed charge, fuel, lubricants, boiler compound and miscellaneous supplies and labor.

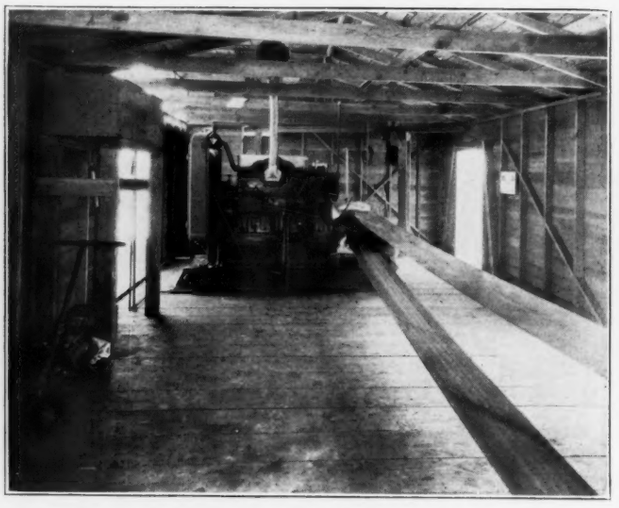
For steam operation, fuel costs were high. The average consumption for a 10-hr. shift was 3½ tons of coal at $8.50 a ton, or $29.75 delivered



Rear view of 120-hp. Buda M. A. N. engine in Schellburg Sand and Gravel Co. plant



Operator at controls and hoisting drums. Julius Keg operation



Front view Buda M. A. N. engine driving an 8-in. pump.

at the shore line. Delivery to the dredge cost an additional $0.50 a ton, one man at $6 a day handling 12 tons from shore to dredge.

The consumption of fuel oil by the diesel engine averages 50 gallons per shift at a cost of $0.065 per gallon, or $3.25 per shift. Fuel is delivered from a truck on the shore to the dredge at a cost of $2.40 for labor for an 805-gallon tank load, or $0.15 per shift.

Lubricant is estimated to cost about $0.35 per shift for the steam engine, and ¾ gallon of $0.65 oil is now used per shift on the diesel, costing $0.49 per shift. Boiler compound and miscellaneous supplies cost approximately $1 per shift under former operation, and $0.20 is now allowed.

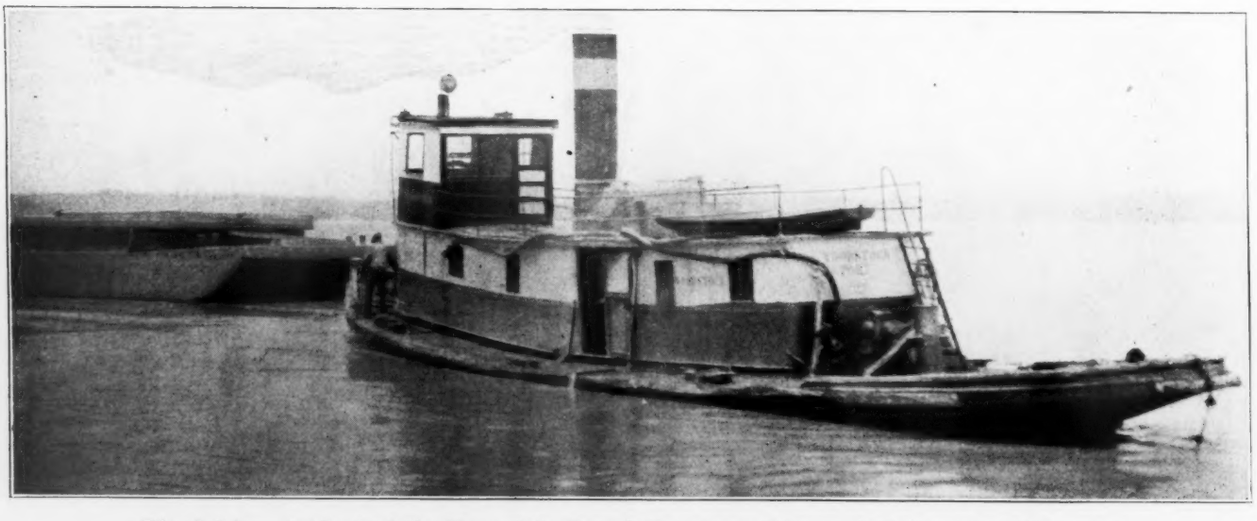
Steam operation required an engineer at $10 per shift and a fireman at $7. Present operation is without the fireman.

The total costs per shift are thus found to be $54.56 for steam operation and $18.71 for diesel operation. With 7.3 and 9.0 hours of actual pumping, the costs per hour of pumping become $7.47 and $2.08 respectively.

Unit costs for power under the actual conditions of single shift operation for steam power and double shift for diesel power are thus $0.0934 and $0.0231 per cu. yd. respectively. In Table B, comparative costs for power are shown under conditions of double shift operation for the steam unit. In that case it is estimated that an additional $300 would be expended for maintenance and repair on the steam plant for double hours of operation. By adding this figure to the total fixed charges on Table A, the total fixed charges per shift are shown to be $3.07 for the steam and $4.62 for the diesel units.

Operating costs would be the same per shift as in Table A except for the change in fixed charge on the steam unit. The total per shift is shown to be $52.92 for the steam unit, corresponding to a cost per cu. yd. of $0.0906. For the diesel unit the figure remains as before, or $0.0231.

The difference shown in cost per cu. yd. for



Diesel-driven towboat of the Tenn.-Ark. Gravel Co., powered by an Anderson type "K" engine

double shift operation of both units is thus $0.0675. Pumping an average of 810 cu. yd. per shift the saving per shift is $54.67. At steady operation for a full season at this rate, 416 shifts, the saving would be $22,742.72. The entire first cost of the diesel unit will be returned nearly twice in the full season at the above rate, if 400 shifts can be worked.

An added saving in fixed charges is effected due to fuller utilization of the dredge through avoidance of lost time for equipment repairs. This is comparatively small, but with approximately $20,000 of capital tied up in the dredge over the cost of the diesel engine, the importance of a full operating schedule is evident.

Mr. Keg is not only satisfied with the reduction in cost of operation, but states that operation is much more satisfactory. It is somewhat doubtful whether double shift operation would have been possible with the steam engine except with supervision now given only during the day. In addition the dredge is cleaner and there is much less vibration, the latter having a considerable effect upon the life of the dredge as a whole.

Table A—Comparative Power Costs on Dredge Steam Engine Versus Diesel Engine Drive *

Investments		Steam	Diesel
Steam engine—second-hand	$ 250.00		
Trucking and labor (est.)	108.00		
Boiler and installation	1,000.00	$ 1,358.00	
Total for dredge—approximately		$21,000.00	
Buda Diesel engine	$12,140.00		
Trucking and labor (est.)	120.00		
Fuel tanks (est.)	300.00		$12,560.00
Total for dredge—approximately			30,000.00
Fixed Charges on Power Equipment			
Depreciation—10-year life		135.80	1,256.00
Average interest at 6 per cent		44.81	414.48
Maintenance and repair—			
Engine and boiler—208 shifts		800.00	
Diesel engine—416 shifts			250.00
Totals—per season		$ 980.61	$ 1,920.48
Totals—per shift, 208 and 416		4.71	4.62
Operating Costs per Shift			
Fixed charge as above		$ 4.71	$ 4.62
Fuel—3.5 tons coal @ $8.50 at shore		29.75	
delivery to dredge @ $.50 ton		1.75	
50 gal. oil @ $.065 at shore			3.25
delivery to dredge—$2.40/805 gal.			.15
Lubricant		.35	.49
Boiler compound and misc. supplies		1.00	.20
Labor—engineer and fireman		17.00	
engineer			10.00
Totals—per shift		$ 54.56	$ 18.71
per hour of actual operation 7.3 and 9.0 hours		7.47	2.08
Unit Cost for Power			
At rates of 80 and 90 per cu. yd. per shift		.0934	.0231

*The above is for different hours of operation. A fairer comparison is given in Table B, based on double shift operation for both.

Primary pump and drive for cutter head and hoist. Julius Keg operation

Table B—Comparative Power Costs for Dredge Operation Based on Double-Shift Operation of Steam and Diesel Units

Annual Fixed Charges	
Fixed charges from Table A	
Steam—for 208 shifts	$ 980.61
Added repair expense for 2nd shift (est.)	300.00

"Starlight" towing material to market for the Pacific Coast Aggregates, Inc. Union diesel engine

Diesel—as before		$ 1,920.48
Totals—per year of 416 shifts	$ 1,280.61	$ 1,920.48
per shift	3.07	4.62
Fuel, lubricant, supplies and labor as in Table A	49.85	14.09
Total—per shift	$ 52.92	$ 18.71
per hour—7.3 and 9.0	7.25	2.08
per cu. yd.—80 and 90	.0906	.0231
Savings Over Steam Power		
Per cu. yd.		.0675
Per shift on Diesel yardage		54.67
Per season of 416 shifts		22,742.72
Net return on investment in Diesel power unit		181%

Diesel-Operated Towboats

Since the use of diesel engines has made such unprecedented success as a prime mover in maritime vessels, it only follows that they are especially applicable in the operation of towboats for transporting aggregate from dredges to the cleaning plant or from the plant to market. This is especially true of one of the most recently constructed towboats, the *W. W. Fischer,* recently put into service by the Central Sand and Gravel Company of Memphis, Tenn. It was constructed by the Nashville Bridge Company and is said to be the largest towboat ever built in the South, the largest ever built for the sand and gravel trade and the equal in power to any direct-connected diesel-powered river towboat in the world.

It is of the twin-screw tunnel type with model bow and special overhung sponson deck construction on the head for towboat service. The general dimensions and principal items of machinery and equipment are as follows: Length, 120 ft.; beam, 26 ft.; depth, 8 ft.; draft, 5½ ft.

The main engines consist of two 360-hp. 6-cylinder Fairbanks-Morse 2-cycle, solid injection marine diesel engines turning 250 r.p.m. The engines are directly connected to the propeller shafting which run in SKF self-aligning, roller bearings throughout. The propellers are 6 ft. in diameter. They are of the 4-bladed removable fluke type and are made of manganese bronze.

There is an auxiliary power plant consisting of a 25-hp. Fairbanks-Morse diesel engine direct-connected to an 18-kw. generator which supplies power for all of the electrically driven units. A 50-cu. ft. capacity air compressor is clutch-connected to this same diesel engine unit.

A 1½-kw. gasoline-kerosene unit is provided for lighting service in case the auxiliary power plant is not running.

The fire and bilge pump is electrically driven and pumps 150 g.p.m. at a pressure of 100 lb. per square inch.

The capstan is electrically driven and has sufficient capacity to break a 2-in. manila line.

(To be continued in an early issue)

Proves the *Leahy* No-Blind Vibrating Screen to be an up-to-the-minute, time saving and dependable screening device for sand, rock, gravel, etc. Handles more tonnage. Costs less to maintain, and reduces operating expense to a minimum.

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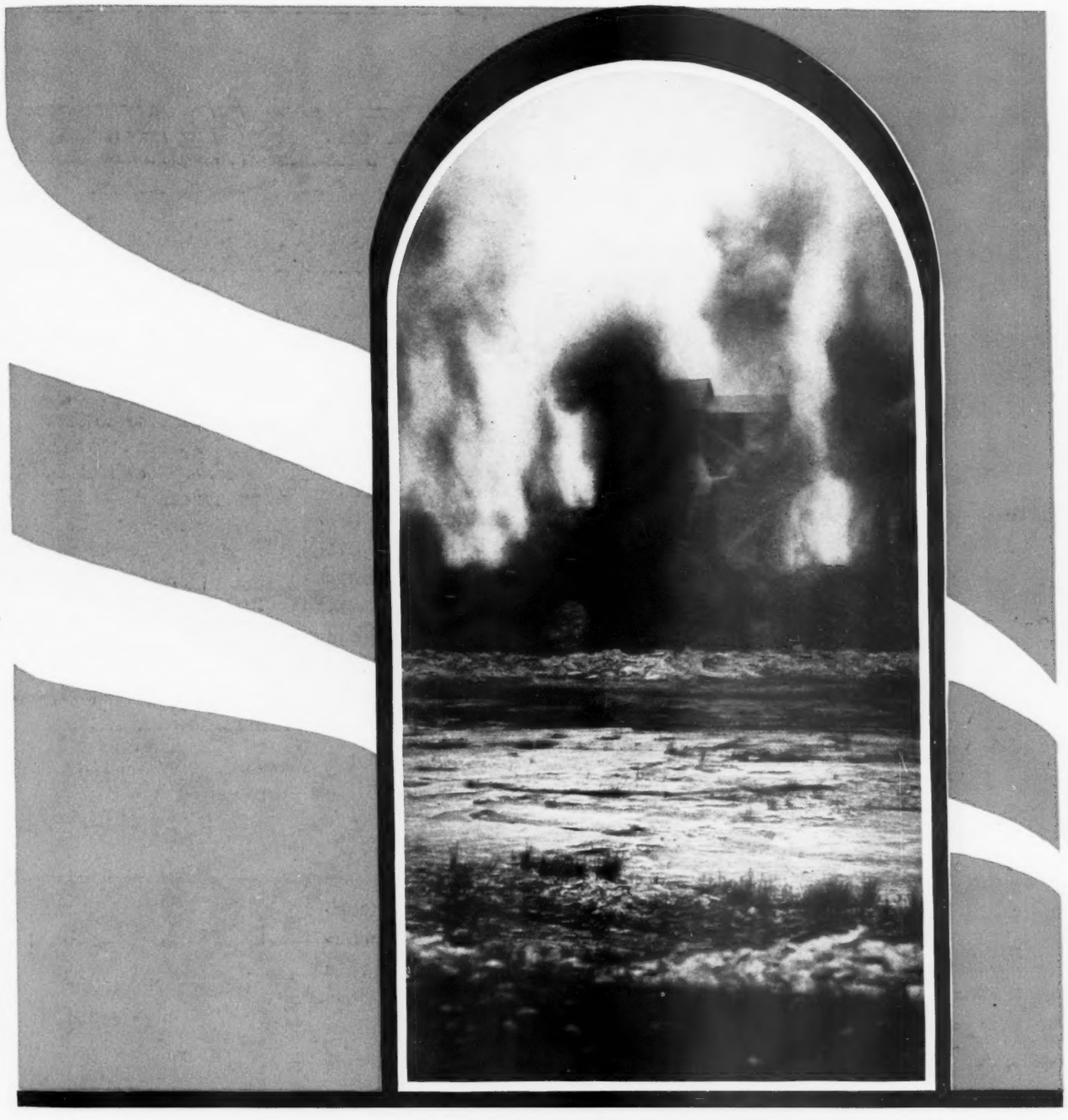

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It saves time and labor in loading. It adds to the efficiency of the explosives used, giving full, positive detonation.

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THIS NEW and COMPLETE REX-STEARNS LINE:

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Each has been thoroughly proven in its particular field; each has successfully demonstrated its value.

This complete line of Rex-Stearns Timken Idlers is now available at a complete range of prices.

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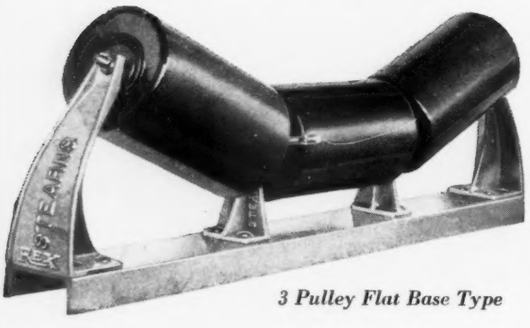
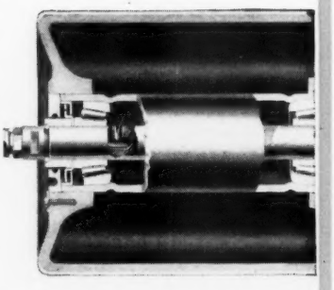


3 Pulley Flat Base Type

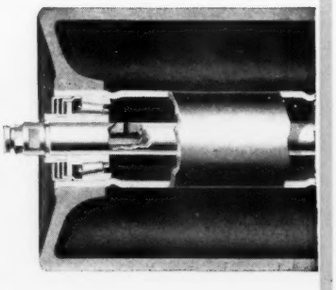
The CHILLED FACE CAST IRON IDLER



For handling the most abrasive materials. Cast in a metal chill, the white iron face of this cast iron pulley is hard enough to stand up to hardest materials.

It is the most wear-resisting idler on the market today, and was designed for the extremely severe service of combined corrosion and abrasion.

The NEW, GRAY IRON IDLER



Ruggedness is the outstanding characteristic of this gray iron idler. The one-piece solid head casting is practically unbreakable, and the gray iron ranks high in resistance against abrasion and corrosion—a heavy-duty idler with all Rex-Stearns features.

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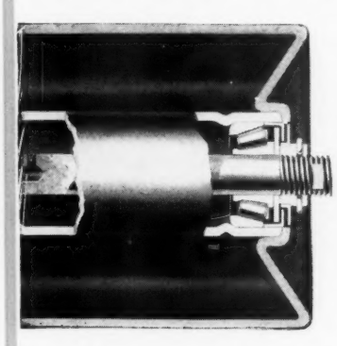

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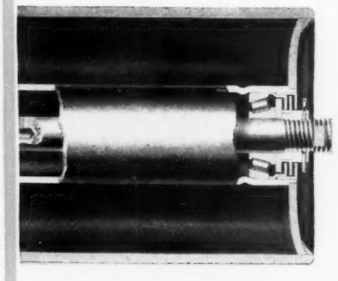

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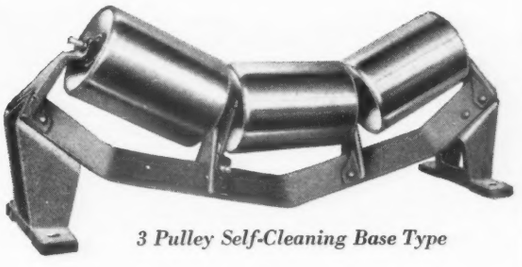

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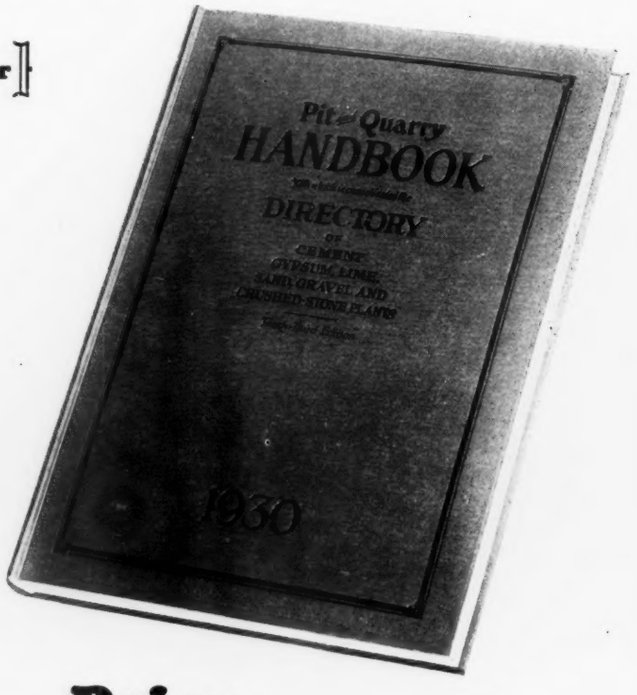

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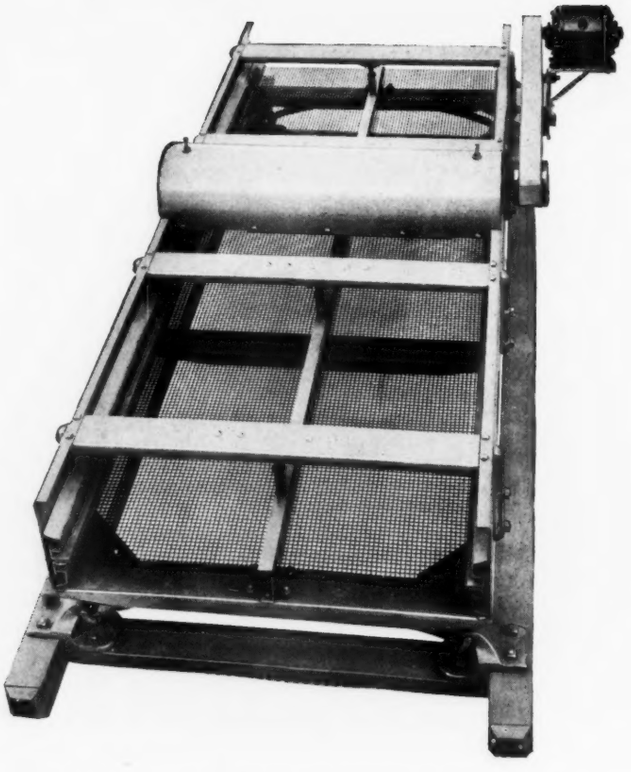

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The Executive and Safety*

By OTHO M. GRAVES,
Vice-President and General Manager, The General Crushed Stone Co.

SINCE the time when our sturdy Pilgrim forefathers landed on Plymouth Rock and fought valiantly and successfully the elements and hostile Indians to establish a foothold and a living place in the land they named New England, and when under fairer skies and on more fertile soil the cavaliers of Old England established their colonies in what is now Virginia, this nation has flourished and prospered. With natural resources of almost unbelievable richness and seemingly unlimited in quantity; with a population growing by leaps and bounds, not only through a prolific birth rate, but also enlarged steadily and constantly by immigration from the countries of the Old World; blessed with a government of the people, by the people and for the people; with the happy prospect before us of increased prosperity under a competent and sympathetic administration, it truly seems as though the thread of our destiny has been woven into the fabric of world affairs by the hand of a master weaver graciously inclined to our welfare.

Nor is this prosperity confined to any small and fortunate class of our population; it is shared and enjoyed by the mass of our citizenry. Though extremes of wealth and poverty exist they are limited in number and are the result of circumstance and opportunity seized by some and ignored by others. With us, as Gladstone said of England, we have the froth and the dregs, but thank God for the good beer in between. In view of our living in these days when prohibition has come and gone, the thought of a glass of beer must be abandoned, though with reluctance.

It is only in relatively recent years when we have spanned the three-thousand-mile width of our continent and planted cities on the Pacific Coast rivaling in magnificence and in population those of the Atlantic seaboard, that we have come to realize that these natural resources must be conserved and guarded with zealous care if we are to continue to thrive and prosper. We have now become accustomed to the phrases which rang strangely in our ears not so long ago of "conservation of forests," "of water power," "of coal," "ore" and the other gifts of a beneficent deity. We have outgrown the moral crutches of such phrases as "Business is business," "Honesty is the best policy," and "caveat emptor." We now clearly perceive that business is good business only when it is conducted along sound, ethical lines. We are honest because we know that we should be, and the material benefits of honesty come naturally as by-products. The buyer is not expected to beware, but is guided and protected. Yet, but slowly, have we come to the realization that fundamental as is the conservation of our natural resources, even more basically important is the protection of the worker.

Otho M. Graves

Of all the material with which we have to work there is none so vitally important, nor so fascinating, as the human. The man who hopes to succeed to the fullest extent without a sympathetic understanding of his fellow man has about as much chance of success as one who searches at midnight in a dark cellar for a black cat that isn't there.

We must necessarily take into account those curious cross currents forming queer eddies in our characters that leads one to observe that at times we seem to have our counterparts in the British Isles, where the Englishman loves his beer, beef and Bible; the Scotchman keeps the Sabbath and everything else he can get his hands on; the Welshman prays on Sunday and on everybody else the

* Delivered originally at the Quarry Section meeting of the National Safety Council Congress in Chicago, 1927, and by request presented, with modification, at the Congress, 1929, before the special session for Industrial Executives and Engineers.

rest of the week; and the Irishman does not know what he wants and won't rest contented until he gets it.

A relatively new thought is manifestly permeating industrial activity—the recognition of the interdependence of employer and employee, a relationship which now approaches economic equality. We are beginning to recognize beyond a mere lip statement to that effect that the employer prospers in direct ratio to the prosperity of his employees. Industry is demanding a new type of executive, who not only intimately knows the processes of manufacture, but who also sympathetically visions and understands the problems which confront his men; one who while directing and governing creates in those associated with him enthusiastic cooperation; a leader, not a boss; one whose integrity, qualities of judicial fairness and human sympathy awaken the loyalty and hold the confidence of his men. To such an executive the physical safety of his men is of paramount importance. He is motivated in safeguarding them in their employment no less by reason of their economic value, impaired as it is by lost time from any cause, than by his humanitarian interest in their welfare and contentment of mind. Obviously, a skilled employee is more valuable on the payroll than on the compensation list, and equally a contented worker is clearly of more value than one discontented and disgruntled, whether his disturbed state of mind comes from a belief that he is underpaid, unappreciated or unduly exposed to unnecessary hazards.

Is the time and money required to promote accident prevention economically justifiable? The reply to this question is in the handwriting on the wall, with abundant proof of an affirmative answer in the experience of our largest industries. The evidence is overwhelming that a safe plant is an efficient one, and conversely, an efficient plant is a safe one. It is being constantly demonstrated that by giving effective attention to accident prevention, insurance costs, however carried, are lowered; and, moreover, production is correspondingly increased; in fact, maximum productivity cannot be attained until accidents are reduced to a minimum.

Not so long ago a well known producer of a mined material said that he would not sacrifice production for the sake of reducing accidents in his mines. Such an attitude would be humorously paradoxical were it not tragic. In discussing his comment the memory whimsically came to mind of an old negro who said that on his farm in Southern Georgia he used to raise horses, black horses and white horses, but that he had to give up raising black horses because they ate more than did the white horses. When asked why this was so, he said, "Ah can't exactly account fo it lessin it is that ah had mo black hosses than ah had white hosses." The logic of the manufacturer and of the old negro is equally unconvincing to the enlightened executive. It seems almost a truism that a clean, neat and safe plant, factory or mine in which the employees contentedly work under conditions as pleasant as the circumstances of the work may permit is necessarily more efficient and richer in productivity than one of which the opposite is true.

It is not the intent of this brief and superficial discussion to enter into the various phases of the relation of employer to employee, nor to consider the several factors tending to produce that harmonious and sympathetic accord which alone can develop the fullest potentialities of any industry. That a human, intelligent and sympathetic interest on the part of the executives of any business is a factor in creating a responsive spirit on the part of the other workers must be admitted. While the paternalistic attitude may be resented, the kindly personal interest of the employer makes a direct appeal to the heart and head of the rank and file of labor.

In reducing the number of preventable accidents, as in any other human activity, orderly planned, intelligent effort results in greater accomplishments than loose, slip-shod hit-or-miss methods. One executive informed me that he meets personally once a day with all of his employees and talks caution. If this is actually done it should achieve splendid results, but I am somewhat reminded of three women who were talking together, one of whom said, "In all the fifteen years of my married life my husband has not said a single cross word to me." The second woman replied, "My, I wish I could say that." The third one said, "Well, why don't you, she did?" It is far from adequate for the manager or chief executive to desire earnestly to reduce accidents with a cautionary word or two every now and again to the employees as to being careful.

The human spirit is adventurous; it seeks new experiences, new sensations; gropes its way unflinchingly into unknown territory, both mental and material. The progress of civilization has largely been due to those adventurous spirits who have dared unknown dangers to blaze the way that later generations may follow in safety. It is not unreasonable to believe that in many instances the lack of care and caution of the workman is attributable to this willingness to face danger, the expression of the spirit of adventure, as well as a desire to serve more quickly and effectively the ends of his employer, whom he may like, respect and admire. He must be taught to discriminate between the bravery of the hero, courageous without stint for a worthy cause, and the needless exposure to danger which may be easily avoided with

(*Continued on page* 84)

Safe Practices in the Quarry*

By THOMAS J. QUIGLEY
Chief Quarry Section, Department of Labor and Industry, Harrisburg, Pa.

HOW to prevent accidents is one of the most important problems confronting the owners and operators of quarries. Accident prevention is like religion, most of us believe in it; but a very small percentage of us are fighting along the right road to prevent accidents. I am not an expert on accident prevention and I am not posing or trying to pose as an expert but I do believe that my experience in the quarries of Pennsylvania, as well as my work for accident prevention, qualifies me to give you my personal views on how to prevent accidents in the quarries and I will furnish you some concrete evidence to prove to you that accidents can be prevented when men and management stand 100 per cent for accident prevention.

The first thing necessary for the reduction of accidents in any plant is that the management from the owner, president, general manager, or superintendent, down to the very last person in the plant must be thoroughly sold on accident prevention. Unless the management stands 100 per cent back of the safety movement you cannot and will not reduce accidents. To sell safety or accident prevention to the owner, manager or superintendent of a plant sometimes requires real high class salesmanship, but if you cannot sell safety or accident prevention to the management, it is a waste of time to try to sell it to the foreman who has but one authority and one duty. His authority is limited to the hiring of men and his duty is to get out the tonnage. To try and sell safety to such a person is a waste of time and energy and no matter how enthusiastic the foreman may be he lacks proper support. When men and management stand 100 per cent for accident prevention and the management demonstrates to the men that he means business and either discharges or disciplines men who violate safety laws and safety rules or men who refuse to act safely or criticise the safety laws, then, and then only will you get real safety results. I have never known of a single case where the safety movement failed when the management was 100 per cent back of it.

Accident statistics compiled both by the United States Bureau of Mines and the Pennsylvania Department of Labor and Industry show that 75 per cent of all accidents are preventable, and by that I mean that 75 per cent of all accidents which occur in industry can be prevented by a real safety organization in the plant and by safe practices. Five causes stand out conspicuously as representing about 75 per cent of all our accidents. They are as follows:

1. Falls of material.
2. Falls of persons.
3. Handing material by hand.
4. Hand tools.
5. Cars and engines.

A careful study of all accidents shows that year in and year out these five causes represent 75 per cent of all our accidents. Many of us, without carefully studying accident statistics, charge most of our accidents to unguarded machines, use of high explosives or electricity when as a matter of fact they represent a very small percentage of our accidents. A well organized plant safety committee backed by the management will reduce the 75 per cent to a minimum. It very frequently happens that when you talk about a plant safety committee, the management thinks you are advocating the employment of a full-time safety engineer. That is not true. While it is very important that large plants should employ full-time safety engineers and experience has demonstrated the value of full-time safety engineers, it is not always necessary to employ a full-time safety engineer especially in small plants. If you have a well organized plant safety committee composed of foreman and employees from the different departments, with the plant manager or superintendent acting as chairman of the committee, and your committee functions by properly reporting all unguarded hazards found during the week or two weeks (depending on how often you hold your meetings), and the chairman takes the proper interest in his position to see that all recommendations are carried out, and all persons guilty of violating the safety laws or safety rules are called to the office and warned as to what will happen if they again violate the rules, you will get the desired results and you can eliminate the 75 per cent of accidents which I have pointed out.

To eliminate from your minds any doubt as to the actual results obtained from plant safety organization, I will mention a few of the many remarkable records made by some of the quarries in Pennsylvania.

The No. 4 quarry of the Penn Dixie Cement Company at Nazareth, Pennsylvania, has operated over four years without a lost-time accident.

The Pittsburgh Limestone Company operated their St. Clair quarry two years and two months, at which time they celebrated the second year without a lost-time accident at the plant.

The Lehigh Portland Cement Company operated four plants in Pennsylvania during 1928 without

* Paper presented before the Eighteenth National Safety Congress, October 3, 1929.

a lost-time accident and was awarded four trophies by the Portland Cement Association.

The General Crushed Stone Company operated the White Haven quarry one year without a lost-time accident and was awarded the trophy of the Crushed Stone Association.

The John T. Dyer Company operated their Monocacy quarry one year without a lost-time accident and many other quarries too numerous to mention have made similar records. This, in my opinion, is sufficient proof of what can be done to prevent accidents in quarries and the records made were accomplished only through real safety organizations, backed by real safety management, and I can say it without fear of contradiction, I have never known a campaign for safety in a plant to fail when men and management work together to eliminate accidents.

That safety pays big dividends is admitted by all of the large concerns. I wish at this time to give you what I believe is one of the most outstanding records made by any quarry company from a standpoint of accident prevention, increase in production, and a decrease in the cost of production. One of our large quarry companies in Pennsylvania had a record of from 350 to 400 lost-time accidents per year over a period of five years. The president of this company was appealed to and he decided to start a safety campaign at once. The records show the following results:

12 per cent decrease in accidents the first month.

24 per cent decrease in accidents the second month.

48 per cent decrease in accidents the third month.

64 per cent decrease in accidents the fourth month.

88 per cent decrease in accidents the fifth month.

And the sixth month not a lost-time accident with one thousand men on the payroll. The president of this company informed me that his production had increased with the decrease in accidents. He further informed me that one of his quarries in 1927 had an average cost of $187 per month for medical fees for treating injured employes and this same quarry from August 1, 1928, up to and including April 17, 1929, eight months and seventeen days, had an expense of only $19.50 for medical fees. Another one of his quarries with an average of $185 per month during 1927 went from August 1, 1928, to April 17, 1929, eight months and seventeen days and paid out only $1 for medical fees, a saving of $1,481.50 in medical fees at the two quarries, and the company operates eight quarries.

This, my friends, is concrete evidence of what can be done to prevent accidents and reduce the cost of production. I do not wish to be misunderstood. I do not want any person in this audience to think I am opposed to safety engineers. On the contrary, I am very much in favor of safety engineers; but this case is one where the president of the company appointed himself as head of the safety committee and went into the safety work with a determination to find out what could be done by means of safety to reduce accidents.

I desire to call your attention to one very important feature of accident prevention work which is overlooked by most quarry managers, superintendents, and foremen. When you walk through the quarry and you see a man performing his work in a way which is dangerous not only to himself but to his fellowmen, stop him immediately. When you see dangerous practices such as men riding between loaded cars, or riding loaded cars on inclined planes, or standing on the end of a moving train without using his hands to protect himself, call the employee's attention to it immediately and warn him as to what will happen if he continues to violate the safety laws and continue such unsafe practices. When you see a man at the face of the quarry working under a loose ledge, take him out of it at once, have the loose stone barred down and the face cleaned before permitting the man to return to work. When you see men working with a hammer with a broken handle, a shovel with a broken handle, a stone fork or a pick with a broken handle, send him to the shop at once to get a new tool, or a new handle. Hand tools stand number four among the number of accidents which we have in our quarries and if the plant manager, superintendent, or foremen will use his God-given senses, his eyes to see, ears to hear, and his tongue to speak and correct the things which I have just pointed out to you, accidents in the quarries will be reduced.

I say to you, my friends, that the 75 per cent of accidents which I have enumerated can be and will be eliminated if the plant manager, superintendent and foremen will take the proper interest in the safety of their men and each morning or afternoon as they travel through the quarry observe conditions and correct the errors. In that way, the management can accomplish wonders for the reduction of accidents. Unfortunately for us, too many men placed in charge of quarries possess wishbones instead of backbones. What we need is more backbone to back up our safety laws and safety regulations, to get better compliance and reduce accidents. Without casting any reflection upon any manager, superintendent or foreman in the quarry industry, I want to go on record that it is the duty of the man placed in charge of the quarries to render to Caesar the things that are Caesar's and give full service for value received from your companies. Accident prevention is one of the greatest and most important duties resting

(*Continued on page* 84)

Putting Punch Into the Safety Campaign*

By JACK DEMPSTER
Canada Cement Company, Ltd., Port Colborn, Ontario, Canada.

It is a great honor for me to have the opportunity to say a few words on behalf of the greatest of all activities, and a pleasure, for I am in a position that is perhaps different from that of the majority of my listeners. I am not an official in our industry, therefore I have a somewhat better chance to judge of the reception of certain lines of procedure by those of the rank and file and, in addition, for some seven years I have been the editor of an employees' publication which has been a sort of intermediary between management and men. An added incentive for me to be somewhat active in safety work is the fact that I suffered an avoidable industrial accident.

Early in this summer, as we all know, the facilities of the National Broadcasting Company were extended to the National Safety Council, in order to present a series of safety talks over the radio, and stimulate an interest in Accident-prevention in the peoples of all classes on our continent, and it was estimated that an average audience of thirty million listeners heard each address. This series met with a wonderful reception, to judge by the number of commendatory letters and requests for copies of the talks received by the Council. Now why did the Council use this method and why was the response so great? Could not these talks have been printed in our newspapers or distributed as circulars and the same results obtained? No! Radio is still a comparatively new thing, and we still get a certain amount of thrill from hearing addresses by the captains of industry and the leaders of our country, especially when we can listen in the ease and comfort of our own arm chair at home. In other words, there was a "punch" in that Safety Series, and because of that "punch" many portions of the addresses will be remembered, whereas, had they been skimmed over in the evening newspaper, ten chances to one they would have been totally forgotten by the next morning.

Getting "punch" into a safety campaign! What is this "punch"? The word, as it is used here, is not found in the dictionaries and the only alternate word we can use for it is "pep." It is a sort of enthusiasm with a "kick" in it, or sincerity carried to the highest degree. For Goodness' sake, can you imagine that any campaign is going to be successful if it is conducted in a half-hearted manner without any thrills whatever, much less a safety campaign, which is to a great extent a psychological reaction? I'm going to say right now, and

Jack Dempster

I know, that a luke-warm safety attitude does more harm to the cause than if a special endeavor was not made at all, for once let men get the impression "Oh, the boss feels that this is something he has got to go through, and he doesn't expect a whale of a lot from it," and—"Say! for Goodness' sake leave the men alone and they'll help themselves a whole lot better." In this game a cynic is the most dangerous man on the plant, whether he be an official or an unskilled laborer, yet I know of some officials who came out with the statement that accident-prevention was just as important a part of their business as production of cement, and —they act as if it were, too.

Why are we attending this meeting of the Cement Section—this Congress? Did we come here to sit comfortably, hear a few talks, listen to some accident figures and remark "too bad"; then see the sights of Chicago and go home, feeling that we have helped the safety movement? If that's right, we'd have helped it a whole lot more by staying home. *Remember this!* We have been chosen to attend these meetings as representatives in an *endeavor*—not to have a good time. Sometimes I wonder whether we are all safety workers, or whether we are putting up a certain amount of bluff, for we all know that accident-reduction in the cement industry is not satisfactory.

* Presented before the Eighteenth National Safety Congress, October 2, 1929.

Yes, I know that some of you are saying that our figures are showing a great reduction; but, I ask you, a reduction from what? Say we had one thousand accidents last year and seven hundred and fifty this year, has accident-prevention improved twenty-five per cent? How do you know that a large percentage of that reduction was not due to the fact that a different class of men was involved, or due to improved operating conditions to increase production? I want to say this, that as long as we can read in the records of the Portland Cement Association, month after month and year after year, without a break in the continuity, accounts of screw-conveyor accidents and fatalities from other causes, we have nothing to be proud of, but rather does it constitute a disgrace—a disgrace to the cement industry and a disgrace to the civilization of North America.

Putting a "punch" in safety work! My God! Isn't the account of one screw-conveyor accident "punch" enough so that there will never be another one, AND YET THERE WAS A FATALITY FROM THIS CAUSE IN JUNE! JUNE, and on the last day of May we stuck our little chests out and said that we weren't going to have any accidents in June at all. That screw-conveyor! In nearly every accident report of the Association we read of one or more cases in which that screw-conveyor is involved, don't we? and it strikes me that that screw-conveyor furnishes a darned good alibi for carelessness! Somebody said that the screw-conveyor is a diabolic piece of fiendish ingenuity. IT IS NOT! It is a whole lot safer than pulverized coal which is being blown by a current of air into a kiln. Yes, that screw-conveyor is an alibi for a good many faults, and how we can allow it to go on grinding living flesh and bones, as well as convey other material, year after year, and then kid ourselves that we are eliminating accidents, is beyond me. Why! our screw-conveyors are more efficient when they are covered by a grating that will keep out foreign material. We all know that and yet we deliberately allow men to uncover them, leave them uncovered while operating and think we are showing mercy to such men by merely reprimanding them. More bluff! A child goes to school to learn a lesson!

"PUNCH!" We need a punch all right, AND HERE IT IS! If we need any more punch than the statement I am going to make, we had better quit calling ourselves safety workers. Do you know that, while we have been patting ourselves on our little backs and receiving plaudits from everyone, from President Hoover down to Mutt and Jeff, because of the reduction in the total number of all accidents, that the number of *fatal* accidents has been steadily and insiduously on the increase? Do you realize that fatalities in the Cement industry have increased, INCREASED, *INCREASED*, until their total is 52 per cent greater for eight months of 1929 than for the same period of 1928, *and where's it going to stop?* We are the ones who are responsible for the deaths of those men! We are the ones who will be responsible for every fatality that adds to this year's total, and we are the ones who should, if we have any manhood at all, have no rest as long as we allow these fatalities to remain as a dirty blot on the pages of our record.

Don't you see, gentlemen, that our batteries are run down? We need recharging. Isn't it a terrible thing to contemplate that on Saturday, August 10th of this year, in our cement industry, there were five men killed! That is a fact, and a very deplorable fact; and isn't it a real punch, right in the solar plexus? Just in case you would forget those five fatalities, let me add that because of them five women were left without a husband and bread-winner, and fifteen children—think of it—fifteen children were left fatherless. Do you realize what a widowed mother of three or more children has to buck against to get along in the world today, and do you realize the handicap that is forced upon those children, who were brought into a merciless, competitive world without their own volition, and then left fatherless? That is a good sized start for an orphan asylum from our cement industry in one day. What a terrible thing a fatal accident is! Just suppose YOU were the next to be stricken down. Can you see what it would mean? And yet, because of the luke-warm, half-hearted attitude that some of us are taking in this work, it strikes me that none of us are immune.

Now, gentlemen, let us be frank and reason this thing out. Let us admit that we are paying too much attention to the avoidance of those which we call "fatal" accidents, and not enough attention to "accidents." One of the cement officials said to me one day, "We are doing very well; we haven't had a *fatal* accident in our whole company so far this year." Just what is a "fatal" accident, anyhow? An accident that causes death, isn't it! And what is a potential fatal accident? One that could or might have caused death! Now then, there is absolutely no difference between a potential fatal accident and a fatal accident, as far as accident-prevention work is concerned, is there? The only difference that there is at all is in the final result from an accident. Well, where are you going to draw the line between an *accident* and a *potential fatal* accident? Three men on our plant received broken legs at different times. One recovered fully; one had his leg amputated at the hip, and the third died. How many or which of these were potential fatal accidents in the first place? Possibly the primary condition of the man who died was better than that of the other two. Three men had their hands caught in machinery. One man shows only a scar; one has lost his thumb and the third man

died. Where would you draw the line there? A man working for our company was talking to some other men; he turned around and somehow injured his knee-cap. He was taken to a hospital and died. One of our foremen received a small abrasion on his neck, very small, hardly bigger than a mosquito bite. He was laid up for months and very nearly lost his life.

EVERY ACCIDENT IS A POTENTIAL FATAL ACCIDENT, and is as much of a blot on our record!

We are too complacent; we are not getting punch into our work at all. We are trying to shift the responsibility, evade the issue and then deplore the facts. For Goodness' sake, if saving human lives won't afford a "kick," surely saving money will and we can dig up stacks of records proving that safety work saves money and speeds up production. The kick that we get out of it will be in proportion to the punch that we put in, and in these days of the Eighteenth Amendment and the Ontario Liquor Control Act you can understand that the "kick" is what makes it work.

A Kansas boy went away from home while quite young and stayed away for a number of years, during which he made a name for himself and, of course, lots of money. They always do in the story. In a sentimental mood one day, he decided that he would return to his old home for a visit, which he did and was given a great reception. Later on, the old minister told him that they intended holding an old-time church social on the following evening and extended a hearty invitation. Our friend accepted and his thoughts went back to his boyhood days and the other socials he had gone to. He remembered how the men sat on seats arranged along one side of the hall and the women along the other side. Invariably the men talked big-time and small-time politics, and over across the room one could hear the women talking about putting up preserves. He went, and things hadn't changed, at least not much. The men were still seated along one side of the hall and the women along the other side but, as he walked up the middle of the floor and overheard snatches of their conversation, he got a surprise. The women were talking about voting to put the mayor out and from the men's side—"And say, fellows, you must boil it for three hours and don't forget to put the yeast in."

If we are sold on accident-prevention work and thoroughly sincere in our efforts, how do we go about maintaining the interest of the men in the ranks? Don't forget, yours is the responsibility for their success or failure and it all depends upon how much they are convinced by you. Recurring campaigns must not be treated as a continuation of other campaigns that were failures. They must be treated as entirely new activities and the method used at the onset will be the one that makes the deepest impression.

A large tobacco company of Canada has adopted the policy of having a man in their employ meet all the immigrant-carrying steamers that dock at Montreal, Quebec and Halifax. Each foreign arrival to our country is quickly interviewed by this tobacco-man and presented with a large package of a well-known brand of tobacco. What are the impressions of that immigrant? He is unversed in the manners and customs of the new country he has come to and he doesn't even know what kind of tobacco to buy, but I'll wager that as long as he lives he will remember that the first tobacco he ever smoked in Canada was that brand given him—and you all know what human nature is. The cost of that tobacco to the manufacturer could well be charged to very profitable advertising. That is why I say I believe that every safety campaign should be launched as an entirely new undertaking, without any reference to previous campaigns, as far as the method of working is concerned, but only for the purpose of comparing results. First impressions are the ones that linger and if at the beginning of each new drive the men *are* impressed, they are half won over.

I have always believed and always will believe, that the greatest factor in this work is that of education. I have seen, as doubtless many of you have, men deliberately remove mechanical guards and not replace them, and men have been hurt under conditions that you would have sworn were mechanically safe. I heard one of the biggest men of this country say that industry was not going to have success in its accident-prevention work until all management realized that personal safety is something that must be included in a curriculum, starting with the school children and included in every branch of industry throughout the land.

Now, gentlemen, in closing, let us get serious. Are we honest-to-God sincere as safety workers? Any man who is devoting his time to accident-prevention work has a foemen that is worthy of his steel. It is something that keeps him awake at nights and possibly contributes a few gray hairs, and a crease or two on his brow but, oh man, think of the reward that comes with the knowledge that you are doing your best to save human beings from being killed, that you are helping to conserve the wealth of the nation, AND THAT'S JUST WHERE WE ARE LIABLE TO PUT A CRIMP IN THE WHOLE BUSINESS if we dwell too long on that fact! We are *not* doing something for which we deserve the thanks of the industry or the community; we are only doing our duty, and we are *not* doing our duty if we are not Safety workers. Does a father expect recognition and thanks when he educates his little child against dangers? This work is never going to be finished;

we are going to receive set-backs and discouragements, but the spirit that has placed PORTLAND CEMENT in the position it occupies in the world today is the spirit that will reduce the accidents from the PORTLAND CEMENT INDUSTRY to practically a vanishing point.

This can be done but it depends on you. YOU are the ones who have made the name PORTLAND CEMENT a synonym for quality and honesty in efficient production. YOU are the ones who have given of the best that was in you to build the world and you are the ones who MUST keep the irreproachable status of PORTLAND CEMENT from being tarnished by the frequency of the accidents suffered in its production. See that we are thoroughly sincere in this matter and for God's sake don't come out with a splash today and then forget the enthusiasm next week. *That's* where Safety work is criticized most by the rank and file. They are not sold to a great extent by your arm-waving and exhortations of today alone, but they are watching—watching to see whether you are going to be working for their safety next month and next year. Surely it's a big job and it takes real men to handle it, but Cement men can do it. The success of all accident-prevention work as viewed by one in the ranks, rests upon one man. The punch, kick, enthusiasm, thrill, call it what you may, is only serious, cool, level realization that, whether you be manager or oiler, superintendent or burner, the only man that can make and keep you safe is YOU, and YOU ARE YOUR BROTHER'S KEEPER!

To put a "punch" in Safety? Can you ask a man today
To dwell upon these horrors; to view without dismay
The loss of human beings' hands, their feet, their limbs, their lives—
The misery and sorrow of their children and their wives;
Homes that were once so happy, echoing now to women's tears;
The future all uncertain, the vision naught but fears—
Can you read without a heart-throb of the graves, now filled with men
Who should, and could, have been alive today, now gone; and then
Is safety work a new-fledg'd thing, just sired by management,
A set of arbitrary rules, or is it really meant
To be humanitarian, a spark of thought, a choice
That bids us pause? Ay! 'Tis just that! Then let us raise our voice
To guard and curb the reckless acts that grind the flesh and blood
Of our best manhood. Wipe that stain, and staunch that bleeding flood;
Those tears of wives and children; but, this thing is surely true—
The only one can put a "punch" in safety work, is YOU!

Figures for Canadian Asbestos Industry

Canadian exports of asbestos during the month of July, 1929, amounted to 24,686 tons, of which 21,669 tons were shipped to the United States and 420 tons to the United Kingdom. The value of the July exports amounted to $1,138,547, while the value of the total shipped to the United States amounted to $850,418.

Exports for the year ended July, 1929, amounted to 287,210 tons valued at $12,213,017, as compared with 260 tons worth $10,811,370 in the corresponding period of the previous year. Exports to the United States in this period amounted to 228,215 tons valued at $8,067,242, as compared with 199,628 tons worth $6,802,530 in the year ended July, 1927.

Executive and Safety

(*Continued from page* 78)

proper care and caution, and that in exposing himself unnecessarily to plant and factory hazards he does not serve his interest nor that of his employer, but actually is jeopardizing both.

I firmly believe that the employee, if convinced that his employer's interest in seeing that he is not hurt is prompted by good will and human kindness, will respect and admire his leader all the more for that interest in him and his welfare. He is not in a position to ask that he be protected; he would feel that it was undignified and even cowardly to do so, but the responsibility is on the executive none the less.

I wish that everyone who has labor under his control could carry in his mind and heart those lines of Pope, which, though written two centuries ago, seem prophetic in their application:

Teach me to feel another's woe
To hide the fault I see
That mercy I to others show,
That mercy show to me.

May God speed the day when this spirit shall guide our thought and govern our conduct.

Safe Practices

(*Continued on page* 80)

upon the shoulders of those in charge of the quarries.

While on the subject of accident prevention I want to say in conclusion to the representatives of the cement industry present here today, that unless you get busy, the cement industry is due for an accident which may prove fatal. Your industry today is in a very serious condition due to foreign competition. The Senate of the United States as well as Congress, hesitates to provide adequate tariff protection for your industry. They are very much afraid to offend their beloved friends in foreign countries. It is the duty of every representative present at the National Safety Congress to get busy upon your return home and demand from your Governors, Senators and Congressmen of your states that they throw off all the disguise they have been traveling under and get under the stars and stripes. Our platform should be America for Americans and our American markets for American products, first, last and at all times.

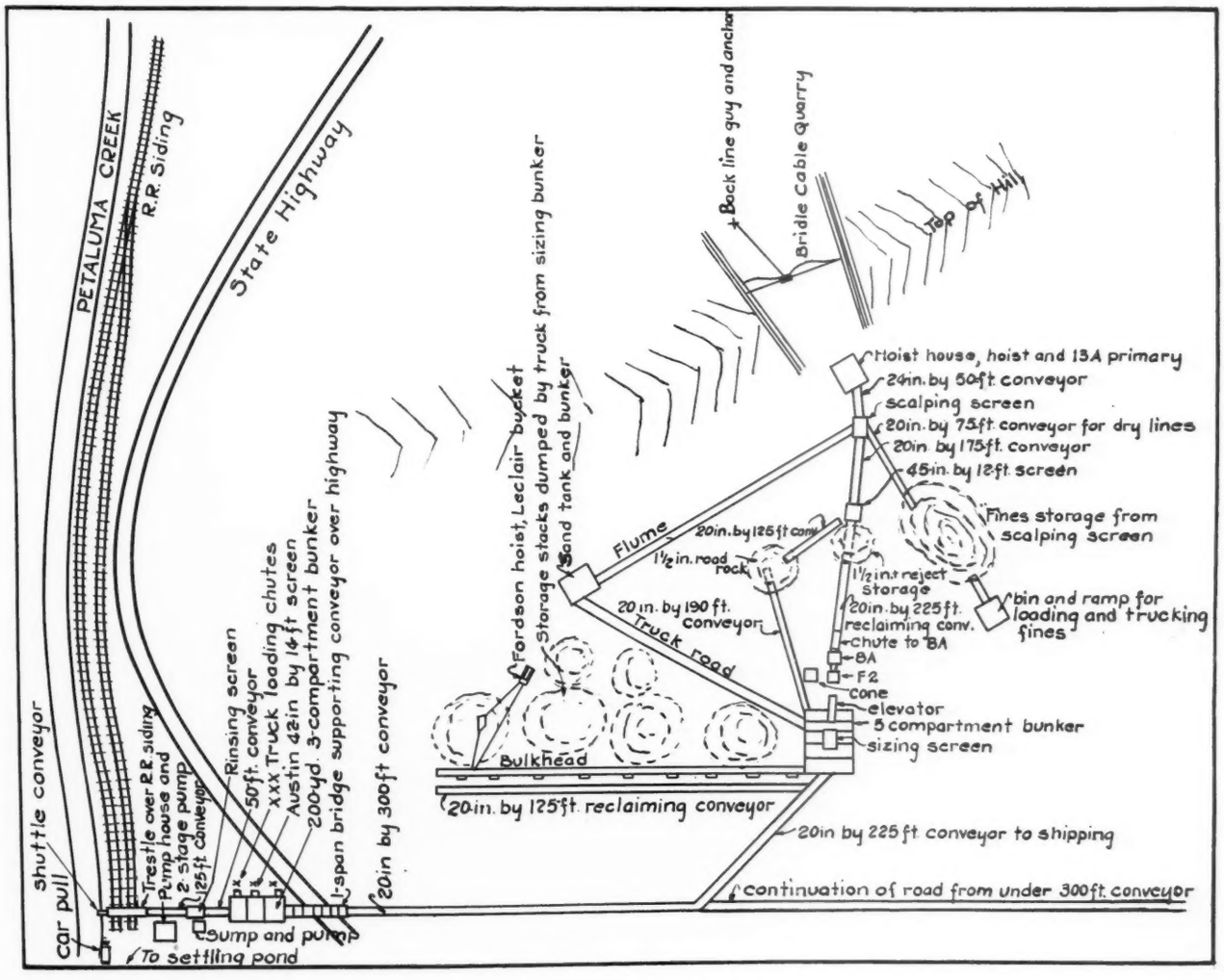
Natural Features Combine to Enhance Commercial Worth of This Basalt Ledge

Hein Bros. Company Supplies Aggregates To Large California Territory

By ERNEST MOYER

ABOUT 40 miles northerly from San Francisco, on California's Redwood highway, is the town of Petaluma, sloganized the "Egg Basket of the World," and with reason, it being the center of an area wherein the annual production of poultry and eggs is a considerable total. Entering the town via highway there greets the traveler on both the north and south outskirts a statue of a white Leghorn hen. In a space between the electric and steam railroad stations, forming two sides, with a highway crossing these tracks making the third side, is a statue of an egg basket. Each of these statues is about the size of a chicken house, or a one-car garage. This is a favorable location also for dairying and stock raising, owing to the combination of low rolling hills, small valleys, and a fresh, cool climate.

As though nature decreed that all "eggs should not be in one basket," at the southeastern outskirts of the town, a hill rises steeply to a height of several hundred feet, the northwestern side facing the town and the northeastern end sloping down until it terminates as the bank of Petaluma Creek. This hill resembles all the rest of this section—grazing land, with a few small groves of trees along the top—but the entire top consists of a good grade of basalt rock, with no change in quality or appearance down to a depth of 200 feet, the distance so far tested. The rock is hard, dense, and of a greyish-blue color, but the stratification



Sketch-map of Hein Bros. basalt rock operations

Showing the close spacing of the crushers

planes are so remarkably abundant that light blasting shatters the formation, the broken fragments running from around 2 in. and up, very few boulders being larger than 12 in.

The Hein Bros. Company controls 20 acres of this hilltop. Shipping facilities are unusually favorable. As stated, the hill ends at Petaluma Creek, a tidewater navigable stream. This brings San Francisco and the other bay cities, as well as a large section of central California, penetrated by navigable streams, within the zone of water transportation. Rail shipments are handled by the Northwestern Pacific R. R., two sidings of which parallel the creek, on bank towards the property. Truck shipments, both town and country, go out via the Redwood Highway which rounds the end of the hill next the creek and railroad.

Quarry Operations

The Hein Bros. Company erected its plant, opened the quarry, and commenced shipping in the summer of 1925. To date all rock has been brought to the primary crusher with a drag bucket. The hoist installation is on the side of the hill facing the town, and about 150 ft. lower in elevation than the top of the hill. The quarry layout is a cut through the top of the hill, V-shaped, with the point towards the hoist. The quarry floor slopes downward away from the hoist at about 6 degrees. This provides two opposing faces, each about 150 ft. high at the peak, and permits the dragging of material from one face with no interference to the blasting preparations under way at the other.

Blasting

At about 15 ft. above the floor of the quarry, holes 20 ft. deep are drilled, toeing into the face at approximately 45 degrees. Springing is done with 40 per cent or 60 per cent dynamite. The loads are black blasting powder, F.F.F. grade. Both Hercules and Giant brands of explosives are used. Detonation is by electric caps, fired by hand battery. As previously mentioned, the rock is so thoroughly separated by stratification that the shock from these low-placed shots so loosens the material of the entire face that as the scraper removes rock along the bottom, everything above gradually slides downward, leaving a new face standing at about 15 deg. from vertical. Oversize boulders are mudcapped.

Records disclose the remarkable ratio of better than 8 cu. yd. of rock obtained for each pound of explosive used.

Ingersoll-Rand Jackhamers and hollow drill-steel are used exclusively for all drilling. Hand swages and a coal forge with a hand blower are the sharpening equipment. A Gardner 9-in. by 9-in. compressor, and 2-ft. by 6-ft. tank compress and store air at 90-lb. pressure for the Jackhamers. A water-circulating pump, for cooling the compressor, is belt-driven from the crankshaft of same. A Penn unloader controls pressure, the compressor running at no load at a pressure of 90 lb. A Fairbanks-Morse ball-bearing motor, 1,200 r.p.m., 20-hp., 10-in. by 9-in. paper pulley, drives the compressor through a leather belt. Both machines are anchored to substantial concrete foundations.

Storage bunkers (left), rinsing screen (center), shipping conveyor (right)

Drag Bucket, Hoist and Primary Crusher

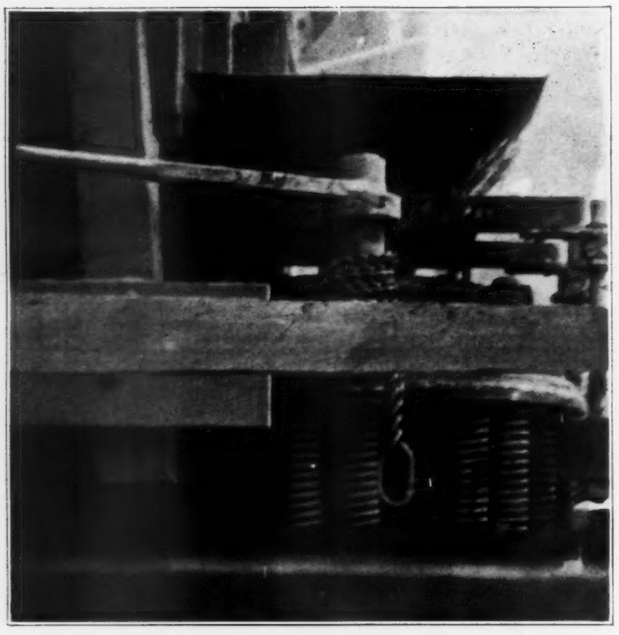
A two-story timbered building with a roof of corrugated galvanized sheets houses the primary crusher. On heavy timbering directly above the crusher is mounted the drag-line hoist, which is of Dasher manufacture and is the standard friction, two-drum type, both drums geared to operate at the same speed. A General Electric 52-hp. variable-speed motor with an electric-car-type controller, drives the hoist through a Link-Belt silent chain. Originally the drive was a rawhide pinion and gear. The drag bucket of 2¾-cu. yd. capacity was designed by the company and built at a local shop. The cutter blades of manganese steel prove both durable and economical. This metal is furnished by the American Manganese Company of Oakland, Calif. The longest haul to date is 375 ft. A bridle cable is stretched across the quarry from top to top of faces, each end anchored. Suspended under this, and traveling on same, is a two-sheave, triangle-shaped carriage at the point of which is a swivel-sheave. Through this runs the back-line guy. Years ago a quarry was opened on the side of the hill opposite the present operations, and it is on the floor of this old quarry that one end of the back-line guy is anchored. At the other end of this line, just through the carriage swivel-block, is a clamped back-line block. Cables attached to the carriage and tied to anchors at the tops of the quarry faces spot the carriage. The back-line and pull-line blocks are of manganese steel, made by the Washington Iron Works and sold in this territory by W. H. Worden Company. The Hein Bros., as general contractors, have used this make of blocks for years, and state that, even under abuse, they have stood up splendidly. The cables are 1-in. pull-line and ¾-in. back-line, usually Boderick and Bascom Yellow Strand, sold by the Worden company. At present a Roebling wire-center cable is being used. Up to May 25, 1929, the drag bucket had been used exclusively, but since then a Northwest gasoline shovel with a ¾-cu. yd. dipper, and truck haulage have been used. One of the trucks is a Packard with solid tires, the other being a White with pneumatic, dual rear tires, both with 5-cu. yd. standard dump bodies.

Drag bucket

Close-up of trunnion on the sizing screen

Primary Crushing

Underneath the hoist, on a space excavated and leveled to provide foundation and head room, is the Telsmith 13-A primary crusher, anchored to a substantial concrete base. The top of the crusher is about 6 ft. lower than the quarry floor where the drag bucket dumps, and a rail-lined chute, 6 ft. wide, at 45 deg., carries the rock, after dumping, to the crusher, the spider-arms of which are set to divide the load. Near the top of the chute is a heavy timber baffle, steel-lined, hinged at top, and counter-weighted to retard the flow of rock. About 3 ft. below this is a second baffle made of heavy timbers, steel-lined, and slung by cables from overhead so that it lays against the chute to further retard the flow. This arrangement feeds the crusher satisfactorily. If, at times, the flow of the rock is too slow, the crusher attendant, using a bar, pries out on the lower baffle slightly. A Westinghouse motor drives the crusher through an American 12-in. by 5-ply belt. The motor is



Close-up of cone crusher

anchored to the concrete base. Above the crusher, on rails spiked on top of 12-in. by 12-in. timbers, is a 4-wheel trolley or carriage, and suspended from this is a 5-ton capacity chain hoist, to handle crusher parts.

Conveyor and Screening

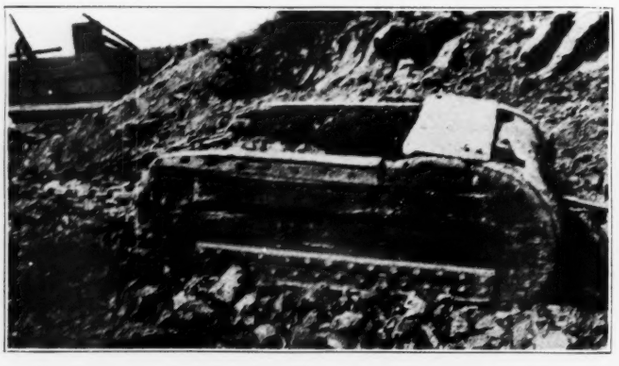
Discharge from the crusher is chuted into a 24-in. by 50-ft.-centers conveyor on a 12-deg. rise equipped with Bodinson 5-roll troughing idlers, head and tail pulley assemblies, and discharges directly into the end of a 50-in. by 12-ft. scalping screen whose main section has ⅝-in. holes with a jacket of wire screen approximately ½-in. mesh. A 7½-hp. motor drives both of these units through a belt to the conveyor counter-shaft on which is mounted a pulley from which the screen countershaft pulley is belt driven. A tightener maintains tension on this belt. Both this and the 50-hp. Westinghouse motor are installed, with their respective controllers, in a frame building central between the crusher and the screen. Both the wet and dry operations are handled by this screen.

For wet work, water is sprayed onto the material from a perforated 2-in. pipe, same entering the screen through a hollow-front center bearing. The small amount of overburden and rock coatings are easily removed and, with screenings from the primary crusher, flow readily through the jacket meshes and then, by a flume, obliquely down the hill to the sand tank of pivot-suspended, counterweight type. This tank is mounted upon and discharges into a bunker of about 100-cu. yd. capacity which has lever-operated gates in the bottom, and a truck driveway beneath. The water with its small content of silt flows to a settling pond.

For dry operation, the jacket undersize discharges onto a 20-in. by 75-ft. conveyor with a 12-deg. rise, this facing downhill at an angle of about 60 deg. from the screen, and discharging to the ground. The conveyor is driven by a 5-hp. motor with a rawhide pinion to the countershaft gear. The rise of the conveyor, in addition to steepness of hill, provides storage room for an immense yardage of this material. At the lower edge of this storage is a small bunker with bottom lever-operated gates and a truck driveway underneath. Much of this waste is sold locally for fills, the prices covering handling only. The bunker is filled by a scraper operated over a ramp by a Fordson-equipped hoist, description of which will appear later. The scalping-screen rejects from both the jacket and the main section discharge onto a 20-in. by 175-ft. conveyor, with a slight drop, this, in turn, discharging directly into the end of a 45-in. by 12-ft. rotary screen having 1½-in. perforations. The screen and the conveyor are belt-driven by a 10-hp. motor through an extended conveyor countershaft, similar to the drive of the scalping screen and the 24-in. conveyor. The 1½-in. by 125-ft. conveyor on a slight drop northerly along the hill and discharge to the ground, a vertical distance of about 60 ft. This size is designated as road rock. Rejects from this screen, ranging in sizes from 5-in. to 1½-in., fall directly to the ground, also a vertical distance of about 60 ft. A short tunnel in the side of the hill ends under the center of this reject storage. A vertical shaft extending upwards from the end of this tunnel to the surface under the reject storage, feeds this material onto a 20-in. by 225-ft. conveyor with a 5-per cent drop, its tail-end being in the tunnel and its discharge about 50 ft. above the ground. Loading is regulated by a Bodinson plate-feeder driven, through sprockets, pintle chain, and a jaw clutch, from the conveyor tail-shaft.

Secondary Crushing and Sizing

Under the conveyor discharge end, on a high concrete foundation is mounted a Telsmith 8-A crusher. Below, on the downhill side, to take the discharge from this crusher is a Telsmith 2-F re-



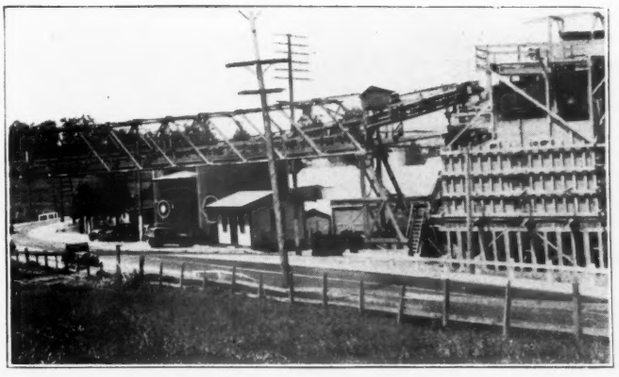
Reversible drag bucket with manganese-steel blade

duction crusher, also mounted on a concrete base. At the side of the 2-F crusher is a 2-ft. Symons cone crusher. All are belt-driven. Each Telsmith is driven by a 20-hp. motor and the Symons by a General Electric, 34-hp. motor. The motors are housed in a frame building uphill from the crushers, with the controllers at the motors.

The conveyor discharges through a chute to the 8-A which, in turn, discharges into the 2-F, and this, in turn, discharges into a chute that feeds the 15-in. buckets on a belt elevator of 42-ft. centers that finally discharges rock into the rotary sizing screen. The main section of this screen is 50-in. diameter by 16-ft. long with perforations of 1¼-in., 2-in., and 3-in. The first jacket perforations are ⅞-in.; and the second jacket is of wire screen, 6 ft. in diameter with the first mesh ¼-in., and the second mesh ½-in. Trunnions under the feed end are 30-in. diameter and have 4-in. face steel rims, running in special long bearings with closed outer ends and grease-cup lubrication. The unusual large diameter of the trunnions gives them a slow revolution, while their generous lines of contact with the screen tires provides exceptionally smooth running. A 15-hp. motor drives the elevator countershaft, and a belt from a pulley on this shaft drives the screen. The screen is mounted on the top of a 24-ft. by 24-ft. by 24-ft. 5-compartment bunker. Various sizes of rock are chuted direct from the screen into the bunker compartments. Along one side of the bunker, is a 20-in. conveyor on 50-ft. centers, driven by a pintle chain from elevator countershaft and discharging direct into the Symons cone crusher.

Any or all sizes 1-in. plus, can be fed to the conveyor by chutes from the bunker. The 1½-in. minus road rock, stacked by the 125-ft. conveyor, is recovered via the shaft and tunnel, similar to the arrangement already described for handling the 1½-in. plus material. This rock is fed onto a 20-in. by 190-ft. conveyor, driven by 5-hp. motor, discharging either onto a conveyor to the cone crusher, a conveyor to shipping, or into a bunker compartment. A truck driveway is under the uphill half of the bunker. Beginning at the lower

Swing-chute loading freight car, and shuttle conveyor loading river barge



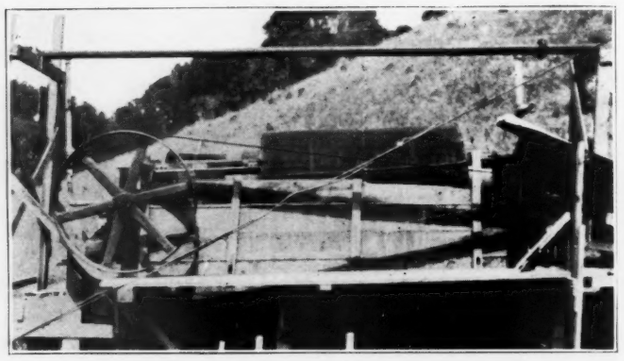
Bridged conveyor over highway

corner of the bunker, and extending out along the hill towards the sand bunker, is a timber bulkhead, several hundred feet long. As crushing proceeds, accumulating sizes that are not shipped immediately, are loaded onto a truck from the bunkers, and dumped in stacks above the bulkhead. A light truck with special low-gear ratio, pneumatic-tired, medium-loaded, backs out over the respective stacks, without difficulty. Against the lower side and at the bottom of the bulkhead, starting level and rising on a 400-ft. radius, is the reclaiming conveyor, 20-in. by 125-ft., driven by a 5-hp. motor, discharging onto the conveyor to shipping.

Feed to the conveyor is by gates in the bulkhead. Obviously, a large proportion of this storage will not feed by gravity. Along the top of the bulkhead, above the gates, rings are anchored in which to hook a snatch-block. A Fordson tractor whose rear wheels have heavy concrete counterweights inside their rims and whose front end is equipped with an Ersted two-drum ballbearing hoist operates a Le Clair ½-cu. yd. bucket through snatch blocks and cables and drags material to the gates at about 75 cu. yd. per hr., average length haul. The readiness with which the Fordson can be moved provides rapid reclamation of nearly all of each size of material.

Loading from the sizing bunker and extending down the hill, is the first conveyor to the shipping bunker. This is 20-in. by 225-ft. and, in turn, feeds the second conveyor to the shipping bunker, 20-in. by 300-ft., level except at discharge end where, for a short section, it rises at a moderate angle. These conveyors are driven by 5-hp. and 10-hp. motors respectively.

A digression here to explain the somewhat indirect routing of the two conveyors to the shipping bunker. When the quarry property was acquired, it was impossible to secure right of way over some other property in a direct line to the shipping point. But right of way over a 20-ft. roadway, branching off from the state highway to the quarry, was acquired. Along this roadway is the trestle-work supporting the 300-ft. conveyor,



Conveyor delivers to scalping screen without a chute

except where diagonally crossing the highway, a one-span bridge is the support. Clearance and headroom between the trestle legs is sufficient for truck and other necessary traffic.

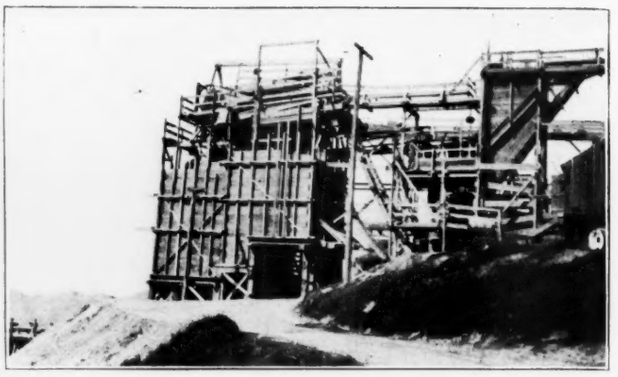
Shipping Section

The conveyor discharges through a two-way chute into a 3-compartment 200-ton-capacity bunker of timber construction, or into an Austin 42-in. by 14-ft. 2-section rotary screen having perforations of ¾-in. and 1½-in. respectively and an individual motor drive. This screen is used only to segregate a special ¾-in. to 1½-in. size, for which there is only an occasional order. The screen is, of course, mounted directly on the bunker, one compartment of which is used for this special size when necessary.

Along one side of the bunker are attached three hinged chutes to load trucks. These chutes are raised as gates to shut off flow. Three chutes in the bottom of the bunker, one for each compartment, of same design as the truck loading chutes, feed a 20-in. by 50-ft. conveyor on a 12-deg. rise, which discharges into a two-way chute.

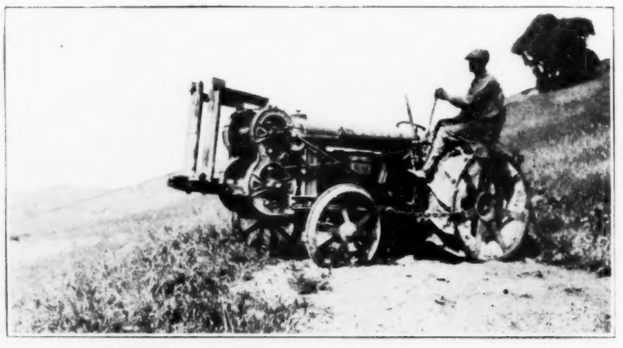
One position of this chute feeds a 50-in. by 10-ft. rotary rinsing screen whose main section has 9/16-in. perforation, and the jacket, 5-mesh, 16-gauge wire cloth. 7½-hp. motor drives the extended countershaft of the conveyor and from this the screen is driven by sprockets and a pintle chain.

Car-puller hoist driven from automobile mechanisms



Elevation of screening plant

A 2-in. pipe, entering the screen through a hollow front center bearing, jets water onto the material. A sand tank under the jacket separates any fine rock from the silt, the silt being flumed to a sump, whence it is pumped to a settling pond by a Krogh sand and gravel centrifugal pump of 2-in. suction and discharge and belt-driven by a 10-hp. motor. If the ¼-in.-minus material is washed, the rock

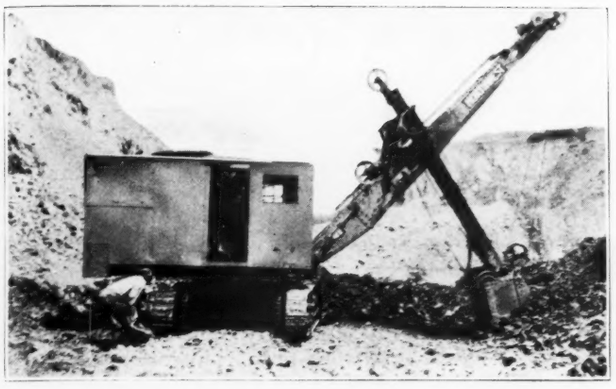


Ball-bearing hoist on tractor with weighted rear wheels

fines discharge from the tank into a conveyor under the screen.

From the other sizes almost no fines pass the jacket, and the small amount of this material that the tank discharges onto the ground is temporarily shoveled out of the way. Rejects from both the main section and the jacket feed the conveyor beneath. This is a 20-in. by 125-ft. conveyor, rising from a level tail-end on a 400-ft. radius, with a 5-hp. motor drive.

Hoist house (upper left), first storage (center), conveyors from tunnels (right)

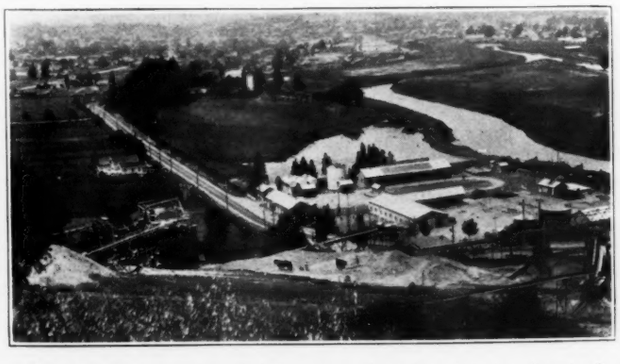


Shovel in quarry

The second position of the two-way chute feeds this last conveyor direct if rinsing is not required. A jaw-clutch sprocket on the 50-ft. conveyor countershaft starts and stops the screen. A trestle spanning two railroad sidings supports the discharge end of the 125-ft. conveyor. For car-loading, the conveyor discharges through a two-way chute into a rolled and welded pipe about 9-in. diameter. This being hinged at the top allows the placing of material in any position desired, and the pipe can be swung out of the way to provide locomotive clearance. A continuation of this trestle at a lower elevation carries a shuttle conveyor 20-in. by 24-ft. which, when extended over the stream, discharges directly into a barge and, when withdrawn, leaves the streamway clear. One position of the two-way chute feeds this conveyor.

Pump Unit for Washing

Anchored to a substantial concrete base and housed in a neat building between the railroad siding and the bunker is a Fairbanks-Morse two-stage, double-suction, ball-bearing centrifugal pump direct-connected to and driven by a Fairbanks-Morse 50-hp. motor. A cast-iron base carries the motor and pump, the motor being mounted centrally between the two stages. The capacity of this unit is 400 gal. per min., at a total head of 290 ft. The suction is a 5-in. pipe and takes water from Petaluma Creek. The discharge line, also 5-in., terminating at the scalping screen, is nearly 900 ft. in length. Through a suitable valve arrangement, the first stage only is used to furnish water to the rinsing screen, if no water is used at the scalping screen. The 10-hp. motor that drives the sump-pump also is in this building.



Road-rock storage (left), ground-rock storage (center), second conveyor to shipping (right). Note flume in right foreground.

Car Puller

At one end of the railroad siding a chassis and a 4-cylinder motor assembly from an old heavy auto is attached to the timbers with the differential locked. On one axle is attached a sprocket, driving, through a pintle chain, a two-drum friction hoist. Cable from the front drum of this hoist, top winding, goes to a block on the opposite end of the siding and back to the rear drum, bottom winding. A loop of chain clamped to the cable and thrown over the end of a car axle moves the car in either direction. For short distances, a lever-type mover is used.

Summary

All conveyors run at the rate of 250 ft. per min. All conveyors—except from the storages of road

General view of plant and hill

rock 1½-in. minus and the first reject, where Bodinson plate feeders are installed—are fed by hinged chutes, raised to shut off flow and with graduated lowering to regulate the rate of feed. Crescent lacings are used on conveyors and Bristol lacings generally around the plant. The Pacific Gas and Electric Company supplies current at 2,200 volts to the plant where it is stepped down to 440 volts. Westco main-line fuse switches are installed ahead of motor controller.

Both of the sand tanks were made by the company and are of the pivot suspended and balanced type, the accumulating weight of sand tilting an entire tank to permit flow through an opening at bottom. In the closed position, an opening rests against a piece of rubber belt attached to a stationary plank. Except as stated otherwise, all motors are Fairbanks-Morse ball-bearing.

The officers of this concern are Mark Hein, president and general manager; J. H. Hein, vice-president and plant superintendent; and Guy Walters, secretary.

Belgian Cement Industry Protests American Tariff

By FRANCIS MILTOUN

[*The writer of the following significant discussion is an American newspaper correspondent stationed in Paris, France, and hence in touch with the Belgian situation. On page 83 of the September 11 issue of* PIT AND QUARRY *he presented forcefully the general attitude in Europe toward the cement industry.—Editor.*]

BELGIUM is protesting in her public prints, as she has protested through the Belgian Chamber of Commerce, against the inclusion of imported cement in the tariff revision of the United States. The pretension is that the American cement industry needs no protection. "Producing companies are paying satisfactory dividends, and frequent and juicy melons are being cut from time to time." This may leave the American temperament still cold but it is agitating cement circles in Belgium to a high fever as they realize that their largest overseas customer may put a handicap on the Belgian—and that of other countries as well, which they quite overlook—product.

The claim is made that the heavy ammunition of the tariff barrage is aimed against Belgium as one of the chief exporters of cement to the United States—237,000 metric tons in 1927, as compared with the total import of 390,000 tons.

It is also pointed out that the United States import of foreign-made cement is but 1/60 part of the country's production, thus but a minor factor in any nation's political economy. It is claimed, moreover, that the prosperity of the American industry is such that it needs no protection, no more today than in the past, from the fact that the cement user in America (consumption being 30,265,125 metric tons whereas production is almost exactly of the same equivalent bulk) without these imports will not be able to fill his growing needs and in any case would be "at the mercy of the American producer." The quotation is exact, harking back to the words of one writing in an Antwerp journal these last days. This, after all, is none of the Belgian rough-writer's business, any more than it is an affair of the Belgian government's Foreign Office or its Ambassador at Washington. Propagandists and lobbyists sometimes rush in with rash statements which injure their very cause. Diplomats and statesmen usually do not.

The value of the above assertion may be judged by the further claim that the proposed 8 cents per hundred pounds is a "prohibitive" tariff and contrary to universally recognized economic principles. The stoppage or serious curtailment of this Belgian export of 237,000 tons to America, it is claimed, will bring about unemployment in the Belgian industry. Taking the last statistical figures of the Economic Section of the League of Nations, which has just completed a world inquiry on the cement industry, Belgium's cement exports to the United States form but 13 per cent of that country's total export and but 8 per cent of its total production. If the Belgian claim is sustained, American customs dues of 8 cents per 100 pounds, which have a bearing on but 8 per cent of the country's production, and that only to the extent that the tariff will really cut down imports, which it probably will not, the Belgian industry is running pretty close to the wind and it seems time that it should brace up.

A tariff of $1.60 a ton is hardly likely to break the Belgian industry if, as is asserted, consumption in the United States is running ahead of local production. The tariff protection which Germany puts on cement from abroad stands at $1.70; France, $1.10; Italy, $3.30; Australia, $2.60; Switzerland, $2.50 and Czecho-Slovakia, $4.80. Why pick on America?

Again it is recalled that the League of Nations document referred to, quoting figures for 1928 furnished from a Belgian source itself, gives the local selling price of artificial portland cement in Belgium as ranging from $0.47 to $0.53 per hundred kilos. American prices reduced to the same proportions were from $1.02 to $1.06 at the same time. What might have been brought into the question and considerably clarified the situation was the fact that wages in the Belgian industry which was producing cement at rather less than half the price that it was produced in America run from $0.85 to $0.95 per eight-hour day, a quotation from a statistical table issued as late as the latter half of 1928. The extra cost of American cement as compared with that of Belgium, taking the example of each on its native heath, is undoubtedly that of the wages which goes into the American worker's pay envelope, in turn to be spent for that well garnished basket of provisions which is the envy of the European worker, to say nothing of phonographs and flivvers. Certainly it is not the increased cost of raw material nor of processes.

It may be mentioned also that Belgian cement destined for export overseas benefits from a discount of 52 per cent from the regular freight rates of Belgium railways.

(*Continued on page* 96)

Commercial Aggregates and Road Ballast Are Produced in Simple, Well-Equipped Plant

Holston Quarries Are in an Immense Mass of Gray Granite

By R. CARL MOORE

ONE of the most interesting and up-to-date operations in the Georgia-Carolina granite belt is that of the Holston Quarry Company at Liberty, S. C. This company produces a crushed gray granite in much demand for road-building, railroad ballast, and the like. There has been a crushing plant at this location for many years, but the present plant was constructed two years ago.

The deposit controlled by this concern is of immense extent, and has been proved to a depth of 375 ft. below the level of the present floor of the quarry which, in places, is over 100 ft. deep. The deposit lies close to the main line of the Southern Railroad in this section, and is paralleled by extensive sidetracks. The quarry was opened at a point near the present level of the railroad, and is being driven steadily into a hill of granite. The overburden is small and, for the most part, is cleanly stripped by hydraulic methods; any large rocks too heavy to be handled in this manner being hauled away by a White 2-ton truck.

There are two quarries located not far apart, the more recently opened one lying only about 100 yd. from the plant. On these quarries three Keystone well-drills equipped with traction wheels operate, first at one quarry, then at the other. Each well-drill is equipped with a 15-hp. General Electric motor, and sinks vertical 6-in. holes to a depth 4 ft. below the quarry floors. The older quarry is being worked on a face averaging 90 ft. in height by 400 ft. in length, while the new quarry face measures over 100 ft. high in places, with an average of about 75 ft. and a length of 1,000 ft. About 25 holes are drilled to a shot in the old quarry and about 65 in the new. These holes are loaded with Trojan dynamite 5¼-in. by 18-in., 50 C, and exploded with Cordeau-Bickford detonating fuse.

Screening tower

Wasteway at Holston quarry

Well drill at Holston quarry

To break up the huge masses of rock brought down by the first blast, many of them as big as a house, secondary blasting is required. For this work 16 Ingersoll-Rand jackhamers, of various sizes, drive holes to the desired depths. These drills are operated by compressed air fed through hoses leading from Ingersoll-Rand compressors installed at the plant not far away. The holes are loaded with 30 per cent Trojan dynamite 1-in. by 8-in. in size, and exploded by means of No. 6 blasting caps.

The rock is hauled from the quarries to the plant in three Mack 7½-ton trucks equipped with 8-cu. yd. Eastern side-dump bodies. These trucks only this year replaced the older conveying system of dinkey engines and tram-cars. They can be used to better advantage in the quarries, and are giving satisfaction. They are loaded by means of a Marion 60 steam shovel in the old quarry, and by a Bucyrus 60 steam shovel in the new quarry, both equipped with traction wheels.

The loaded Macks reach the unloading platform in the primary crushing house by means of a short ascent. Located here are two Allis-Chalmers 30-in. by 96-in. gyratory crushers, belt-driven by 150-hp. motors, one an Allis-Chalmers, the other a Fairbanks-Morse. Dumping is performed by an air hoist, furnished by Easton Car and Construction Company. There is also a 10-ton Whiting overhead traveling crane operating on a runway which extends over both crushers and out over the sidetrack, making unloading and placing of any heavy equipment or crusher repairs easy. Both crushers are set to 4-in. and discharge through pan feeders to a 30-in. conveyor belt driven by a 75-hp. General Electric motor. The lower end of this conveyor belt operates in a pit blasted out of the solid rock underneath the crushers; the upper end discharges to the secondary crushing tower. The belt is set on 275-ft. centers, and slants upward at an angle of 3 in. in 1 ft. In dry weather it is kept moistened by a stream of water to keep down the dust.

This belt discharges to a Stephens-Adamson live-roll grizzly primary scalping screen driven by a 25-hp. Fairbanks-Morse motor. All material over 2¼ in. in size falls to one of two Newhouse crushers, the flow being split in falling. One of these Newhouse crushers is Style B, the other is a No. 7. These crushers are set to 1½-in. and are operated by direct-connected Allis-Chalmers motors. They discharge to a 24-in. return conveyor belt set on 100-ft. centers in closed circuit with the grizzly screen. The correctly sized material passes from the grizzly to another 24-in. belt set on 225-ft. centers, and driven by a 25-hp. Fairbanks-Morse motor. This belt conveys the material to the screening tower. All of the belt conveyors in this plant were furnished by Stephens-Adamson Company.

In the screening tower are six Hum-mer screens which screen the rock to three sizes: 2¼-in. to 1¼-in., 1¼-in. to ½-in., and ½-in. to ⅛-in. The screens making the largest size are operated by V 64 Hum-mer electric vibrators, those producing the smaller sizes by Hum-mer V 16 vibrators. All are operated through a motor-generator set driven by a 10-hp. General Electric motor. The fine dust discarded by these operations is collected on a 20-in. belt conveyor driven by a 10-hp. Fairbanks-Morse motor, and set on 200-ft. centers. This carries the dust across the railroad tracks and discharges it through a chute into a storage pile

Water tanks

Building for office and stores

located in a meadow. There is little use for this size material.

The three commercial sizes, after passing the Hum-mer screens, fall directly through chutes to the storage piles below. The chutes conveying two of the three sizes lead directly from the screens, while the third size falls from the screens onto a 20-in. belt conveyor set on 100-ft. centers and driven by a 5-hp. Fairbanks-Morse motor. This belt also discharges, through a chute, to a storage pile beneath.

These storage piles are located in a single straight line, and underneath all of them runs a concrete tunnel about 7 ft. high and as many wide. In this tunnel a 24-in. conveyor belt, set on 200-ft. centers and driven by a 25-hp. Fairbanks-Morse motor, operates continually. Beneath each of the three rock-storage piles are located five chutes. The conveyor belt is thus fed by fifteen chutes through which the flow of material can be regulated at will. By this method, the crushed material can be either furnished from one size or quickly blended in any proportion that may be required. This belt slants upward at a slight angle, running parallel to the railroad side-tracks. It discharges, when out of the tunnel, to another 24-in. conveyor belt running at right angles to it. This belt is set on 150-ft. centers, and leads directly to the loading tower located over the side-tracks. In this tower are located a Gilbert washing screen for use if the material is loaded wet.

A steam shovel in new quarry

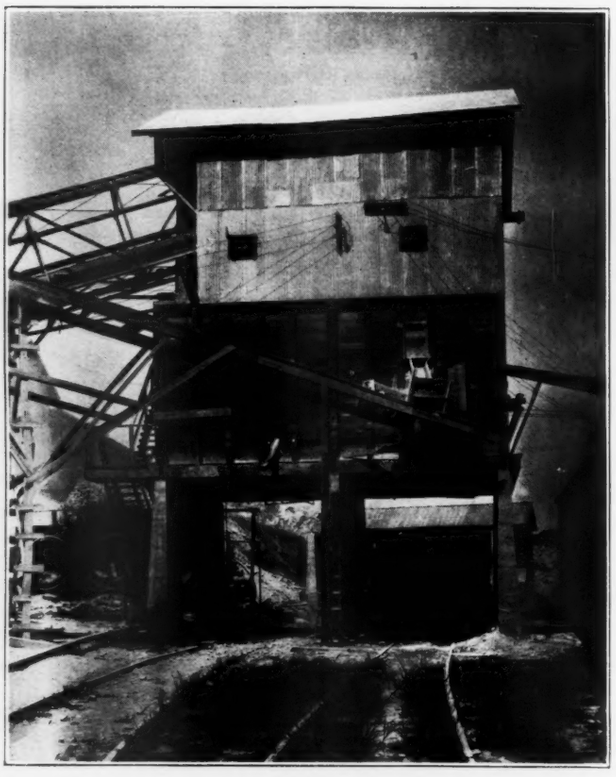
Trucks unloading to primary crusher

This screen is connected to the head pulley of the conveyor belt. In case the rock is loaded dry, it is run over a Universal vibrator set to the desired size.

Cars are placed directly beneath the tower, and loading is performed through chutes. The fine material screened out by the final sizing in this tower, being coarser than that discarded in the main screening tower, is returned over a 20-in. conveyor belt, set on 150-ft. centers and operated by a 5-hp. Fairbanks-Morse motor, to a storage pile located near the main rock storage. The water used in these operations escapes through a flume line leading across the tracks and a considerable distance down into the meadow. The railroad cars loaded are either of the flat bottom or of the regular ballast type. They are weighed at the plant on automatic railroad scales.

The capacity of the plant is about 2,000 tons per day. Power is purchased from the Duke Power Company. The larger motors are 2,300-volt; the smaller, 220-volt. The control board is located in a building near the transformers across the railroad tracks from the plant.

A completely equipped blacksmith shop is located on the grounds and contains a No. 5 Ingersoll-Rand steel sharpener and an oil furnace. The compressed air is furnished by two Ingersoll-Rand air compressors located in a separate building. One of these compressors is an XCB leaf-valve type with cylinder sizes 9¼-in. by 12-in. and 15-in. by 12-in.



Final sizing and loading tower

respectively; the other compressor is an SB type with Corliss valves, and cylinder sizes 19-in. by 16-in. and 12-in. by 16-in. The smaller of these compressors is driven by a 100-hp. Allis-Chalmers motor, and the larger by a 150-hp. General Electric motor. All conveyor belt motors are equipped with Jones speed reducers.

The company has erected a number of frame houses near the plant for the use of its employees, and maintains a commissary on the grounds.

The water supply used for the steam shovels, compressors, and Newhouse crusher bearings, as well as for the plant operations, is secured from a nearby creek where two pumps are located. One pump is a Fairbanks-Morse two-stage centrifugal, driven by a 200-hp. General Electric motor, while the other is a Fairbanks-Morse single-stage centrifugal, driven by a 35-hp. Fairbanks-Morse motor. These pumps force streams of water 6-in. and 4-in. in size, respectively, to two cylindrical steel tanks located at a point near the top of the new quarry above the plant. The capacities of these tanks are 20,000 gal. and 6,000 gal. respectively, and from them water is drawn as needed to various points.

It can be seen from the foregoing that this plant is designed to operate with as much simplicity as possible, and with low upkeep and operating costs. The entire plant is located in an almost straight line parallel to and beside the railroad sidings. The plant and quarries together employ about 65 men. The labor is mainly negro. The recent industrial development of South Carolina is accompanied by

Steam shovel loading truck in quarry

an extensive road-building program, and this has reacted considerably to the advantage of the Holston Quarry Company.

The main office of this company is at Knoxville, Tenn. The officers at Liberty are R. S. Campbell, vice-president and general manager, and Roy Reynolds, plant superintendent.

Belgian Cement Industry Protests

(*Continued from page 92*)

The revised wage scale for European workers—a revision which can only be upward, as already anticipated by Mr. Ford in his plans for the establishing of European plants—is probably the cure for many of the industrial ills of Europe. It is more likely to be the case. Tackling the European wage question is a more humane economic warfare than attacking American industrial methods.

If the American consumer is now absorbing quite all the annual home cement output, he is evidently not loudly clamoring for a lower price and, in any case, the ruling prices in the United States, Germany, France and Italy are virtually the same. In Great Britain they are rather more. Belgium can hardly have an answer to that, considering the tariff which Germany, France and Italy impose on foreign cement.

The New Board of Directors for the Council

At the initial session of the National Safety Congress September 30, the following three new men were elected to the board of directors:

H. B. Flowers, president, New Orleans Safety Council, New Orleans, La.

T. W. Bachus, vice-president and general manager, Hercules Powder Company, Wilmington, Del.

Paxton Mendelssohn, philanthropist, Detroit, Mich. In addition to these, the directorate includes:

L. A. DeBlois, New York
G. T. Hellmuth, Chicago
Miller McClintock, Massachusetts
W. A. McGonagle, Minnesota
John A. Oartel, Pittsburgh
C. E. Pettibone, Boston
Henry A. Reninger, Allentown, Pa.
Dr. A. D. Risteen, Hartford
C. B. Scott, Chicago
H. M. Webber, Chicago
A. W. Whitney, New York
W. H. Winans, New York

National Safety Council Holds Highly Successful Annual Congress in Chicago

Pit and Quarry Industries Benefit by Discussions Of Accident Prevention

ANYONE who attended the Eighteenth Annual Safety Congress must have realized that it did not just happen. Evidence of the painstaking preparation was apparent in every feature, and reflected, most creditably, the efforts that must have been expended by its officers and executive committee. This was the regular annual convention conducted by the National Safety Council, covering widely differing phases of modern life.

The Congress was too big an occasion to be completely accommodated in any one of Chicago's many great hotels so its meetings were distributed among the Stevens Hotel, the Congress Hotel, and the Eighth Street Theater. The Exposition was housed completely in the Stevens Hotel and was particularly attractive and instructive.

Henry A. Reninger, in his welcome to delegates and guests, stated that, during the past year, approximately 96,500 persons in America were killed from so-called accidental causes. These accidents were distributed as follows: 26,500 by automobiles, 24,000 in industries, 24,000 in homes or in domestic pursuits, 20,000 in public places but exclusive of automobile tragedies, and 2,000 unclassified. He said further:

President's Address

"You will be interested in knowing that on July 1 of this year there were 5,050 members in the National Safety Council, the largest membership in the history of the organization. What a contrast from the original membership of five back in 1913. In those days we had a managing director and his force consisted of one stenographer. Today we find the same managing director—our own W. H. Cameron—guiding the many activities of the National Safety Council with an office force of 108 departmental heads, engineers, statisticians, librarians, editors, artists and office assistants.

"We find the safety message being heralded each month to ten million people through our posters and various publications. We find our work effectively catching hold in the homes and in the public schools. And we find general committees of nearly 1,000 members voluntarily devoting a large share of their time and energy to this work.

"Our growth has been amazing—but we must not forget that while we have grown, the accident problem itself has been growing also. That is why the big task still lies ahead of us."

Later when acting as a "pinch-hitter" for an absentee speaker at the joint luncheon of the Cement Section and the quarry section, he insisted that safety work can never be permitted to slacken because, for one reason, there is ordinarily such a turnover in the industries covered by these sections that new employees must be continually impressed with the importance and significance of the movement. He advised the practice of holding foremen just as much responsible for the safety of their men as for the necessary commercial production. As he has reiterated in his many stirring addresses heretofore, he places confidence in the oncoming generation of children who are learning safety in the schools, for these children will gradually displace the older employees who grew up without any thought of safety practices. He urged a permanent continuance of such school instruction which is so well prepared by the National Safety Council as to place very little extra effort upon teachers.

The real business of interest to our readers began the second day, Tuesday, October 1. Simultaneous sessions were held by the Cement and the Quarry Sections in the Congress Hotel. At the cement session, F. E. Town, superintendent of the Manitowoc Portland Cement Company, Manitowoc, Wis., was chairman, and A. J. R. Curtis, assistant to the general manager of the Portland Cement Association was secretary.

Cement Section Convenes

In his address the general chairman pointed out some of the features that marked the progress in accident prevention for the cement industry and mentioned the strides toward a worthy goal. He was much more assertive as he called attention to what is expected of the delegates to the National Safety Congress in blotting out fatal accidents as they have succeeded in reducing the minor accidents.

R. B. Fortuin of the Pennsylvania-Dixie Cement Corporation was called to present the report of the Poster Committee. He stated that the committee had made considerable progress and had defined three specifications for posters: they must be drawn from original photographs; they must be drawn simply; and they must be comprehensive.

At 9:45 a.m. the chairman called for the paper by M. L. Humphryes, mechanical engineer, Universal Portland Cement Company, Chicago, "Symposium on Screw-Conveyor Accidents." The paper

was well received and, at the suggestion of the chairman, was discussed by M. Brewer of the Alpha Portland Cement Company. He related some experiences and pointed out that workmen will continue to have contempt for the dangers of screw conveyors unless the idea of the hazards is brought to their attention.

A. J. R. Curtis, assistant to the general manager of the Portland Cement Association and secretary of the cement section, read several letters from operators concerning recent screw-conveyor accidents and Mr. Curtis outlined some of the horrors involved in them.

Henry A. Reninger, president of the National Safety Council for 1929 and special representative of the Allentown Portland Cement Company, was observed by the chairman and invited to address the section. Major Reninger responded by outlining some of his duties and complimenting the cement section. He related reminiscences of the early days of safety selling and pointed out that the cement industry has made the greatest progress in accident prevention of any industry. "The greatest advertising for the cement industry has been its success in the safety movement," he stated. He pointed out that his year as president of the National Safety Congress had been a pleasant one, but stated "I am going home to brush off my desk and enjoy the companionship of my deserted wife."

New Officers of Cement Section

The chairman called for the report of the Nominating Committee which was represented by its chairman who read the preferences of the committee. The report was accepted. As there were no nominations from the floor the officers for the ensuing year, as presented by the committee, were unanimously elected. Among those elected were: general chairman, Edward H. Parry, safety director of the Glens Falls Portland Cement Company, Glens Falls, N. Y.; vice-chairman, R. B. Fortuin of the Pennsylvania-Dixie Cement Corporation; and news editor, Jack Dempster of the Canada Cement Company, Ltd., Port Colborne, Ont.

The second paper of the session, "The Surgeon's Part in Accident Prevention," was presented by J. L. Rock, M.D., of Oglesby, Ill. The paper, which carefully fulfilled its purpose of acquainting safety engineers with accident prevention as viewed by a practicing surgeon, was well received and the discussion indicated that it was of far-reaching effect. As scheduled, C. E. Ogden, M.D., of the Universal Cement Company, led the discussion of the paper. Dr. Ogden was in hearty accord with the qualifications of a cement plant surgeon as outlined by Dr. Rock and agreed that first-aid kits should not be placed about the plant. He is not impressed with non-stop accident prevention records unless the accidents are actually prevented. He believed in physical examinations and treatment of physical defects as a preventive of accident hazards.

Dr. J. C. Beach reviewed the paper and complimented the authors on the progress the medical profession is taking in industry. A. J. R. Curtis followed with a review of some of the necessary practices for the further reduction of hazards and the later discussion was largely concerned with the training and use of first-aid men in the plants.

The chairman then called for additional discussion of the "Screw Conveyor" paper, calling on Mr. Hamilton to present his views. This was followed by pointed expressions from many of those present, especially the fact that the Universal Cement Company, for which Mr. Humphryes is mechanical engineer, has had no screw-conveyor accidents.

Session of Manufacturers

R. E. Colville, manager, insurance department, the U. S. Gypsum Company, Chicago, was chairman of the Quarry Section sessions, and J. R. Boyd, of the National Crushed Stone Association, served as secretary.

Mr. Colville, in reviewing the activities of his section during the past year, commended the efforts of men in the U. S. Bureau of Mines, Portland Cement Association, National Crushed Stone Association, and the National Sand & Gravel Association. He announced the completion of a "Safety Manual for Quarries," which is about to be offered to interested persons for constructive criticism before it is actually published for general distribution as a real guide to every activity in quarrying operations.

H. F. Yotter, insurance supervisor of the General Crushed Stone Company, Easton, Pa., spoke to the title "Safety Through the Eyes," and gave an account of the poster and bulletin-board practices for training men. He stated that workmen must be shown new posters from time to time and that these posters must bear upon potential dangers with which they are confronted. The poster committee needs suggestions and solicits photographs or sketches exhibiting good messages. The discussion that followed his address was lively. One item related to eye accidents, and one delegate expressed the belief that the ordinary goggles that are furnished workmen actually increase hazards by obstructing vision. Several delegates agreed that simple spectacle goggles with side plates of glass are preferable to the larger goggles with metal shields.

W. W. Adams, statistician, U. S. Bureau of Mines, Washington, D. C., gave a "Review of Injuries in Quarry and Crushing Operations." Perhaps the most significant item of discussion following this paper was the need for some sort of guard against injury by swinging cranes and shovels. The

practice at one plant is to use plenty of brilliant red paint on the parts that swing.

B. E. Welty, production manager, Pacific division, U. S. Gypsum Company, spoke, giving "The Executive's View of Wastes," which also is printed herein in full. He opposed any practice that implies to men "Please be safe" and advocated the instruction "You must be safe." This does not mean that the humanitarian phase of safety work need be suppressed but rather that the workman must be shown that it is to his own personal interest—in dollars—to work safely. The discussion elicited the tendency that has arisen in some plants to suppress reports on accidents in order to maintain high ratings in safety contests, and such practices were condemned.

On Tuesday afternoon a joint session was held by the quarry and cement sections with R. E. Colville as chairman.

Quarry and Cement Sections Hold Joint Session

T. Quigley, chief of the quarry section, Department of Labor and Industry, Harrisburg, Pa., spoke upon "Safe Practices in the Quarry." He emphasized his belief that seventy-five per cent of the usual accidents in and about quarries are really avoidable, and he supported this contention by citing actual cases in which his recommendations as to practice had been tried in Pennsylvania. During the discussion that followed, W. W. Adams of the U. S. Bureau of Mines stated that 1928 was the best year, for which statistics are available, in these industries, fatalities showing a reduction of about ten per cent, while non-fatal accidents decreased twenty per cent.

J. R. Davis, assistant to the vice-president, U. S. Gypsum Company, Chicago, next read a paper entitled "The Hidden Costs of Injuries, from the Executive's Viewpoint." The paper and the subsequent discussion covered numerous phases of accident costs not ordinarily considered.

The paper by Jack Dempster of the Canada Cement Company, Ltd., Port Colborne, Ont., held the members spellbound. Its title was "Putting Punch Into a Safety Campaign" and certainly fulfilled its function. There will remain in the memory of the delegates a lasting impression from this simple address by a man who knows whereof he speaks, not that he is an official in any sense but because he carries a permanent evidence of a severe accident and is intensely interested in safe practices. This address is published in full in this issue.

The first address before the Cement Section, on Wednesday morning, at which F. F. Town presided, was "First-Aid Training Suggestions," by J. J. Forbes, supervising engineer, U. S. Bureau of Mines, Pittsburgh, Pa. A. J. R. Curtis led the discussion and explained how the Portland Cement Association became interested in the safety movement, at the suggestion of Dan Harrington, who offered the full services of the Bureau gratis. To date 103 cement mills have had the Bureau's first-aid training, this reaching approximately 7,000 men. The American Red Cross is conducting similar training of cement workers, especially in Oregon. Mr. Curtis feels that men who take the training are seldom victims of accidents. But the interest in first-aid and accident prevention must not be permitted to lag, if betterment is expected. Mr. Forbes then expressed his belief that men obtain the gratest permanent benefit from first-aid classes when these classes are conducted outside of regular working hours. If men are eager enough to devote their own time to this study, they feel that they are acquiring more than if they take the course on company time. The Bureau's experts will give courses at any hours desired.

A physician in the audience felt that, although first-aid training makes men more careful, it does not give them the desired qualifications for rendering first-aid to injured fellow employees, and that physicians should be called in quickly to administer the first-aid. This point elicited discussion, the Bureau officials insisting that its first-aid efforts are to train men for actual emergency aid only, that is, until a physician can be secured.

The cement section closed its session with a paper by W. H. Weitknecht, superintendent of the Lehigh Portland Cement Company, Mitchell, Ind. Speaking upon the topic "Fatal and Permanent Disability Accidents in the Cement Industry," he severely criticized the lax practices of safety officials in filling out reports. The usual shortcoming is negligence in explaining the true cause of an accident, and Mr. Weitknecht rendered an indictment against foremen and overseers in general. His paper was regarded as the climax of the whole meeting, and we shall publish it in full in our next issue.

Chairman Colville, in opening the Wednesday morning session of the Quarry Section, called on its secretary, J. R. Boyd, for his paper on "Keeping Abreast of the Times." In discussing this topic Mr. Boyd stressed the importance of each section member's co-operating toward making the "News Letter" a really useful service. He asked them to help avoid accidents by writing freely of their own accident experiences, so that fellow operators may adopt preventive measures before experiencing accidents of the same type. In the discussion which followed some of the members acknowledged their remissness in failing to give this co-operation and promised to discharge the responsibility in the future.

Quarry Section Election

The secretary submitted the recommendation re-

(*Continued on page* 102)

Construction Aggregate Prepared from Basalt Excavated in Providing Approach to Bridge

ONE of the sidelights of the construction of the world's largest bridge—the new Hudson River bridge between Fort Lee, N. J., and Fort Washington, N. Y.—is that the excavations in the Palisades on the New Jersey side of the bridge were so enormous that the contractor erected a complete and well-equipped 1,000-cu. yd.-per-day crushing plant to make a commercial product from the stone produced by these same excavations.

The Hudson River bridge will be the longest suspension bridge in the world, with a main span of 3,500 ft., exactly twice the length of the longest span in existence when this bridge was begun. It will be supported by four long cables of 36-in. diameter—cables 3 ft. in thickness! Each side span will be approximately 650 ft. long, making the total length 4,800 ft.

Part of the excavations on the New Jersey side are for the anchorages of the huge suspension cables, which will be anchored to steel grillages in two wedge-shaped concrete-filled tunnels. The remainder of the excavating work there is for the deep approach cut carrying the roadway from the bridge through the rocky cliffs of the Palisades. All of these excavations are in solid basalt, and it is said that one of the reasons that Foley Bros., Inc., the contractors on this part of the work, were able to underbid their competitors is because they had the foresight to plan on installing a crushing plant and make a marketable product from this unusual "quarry."

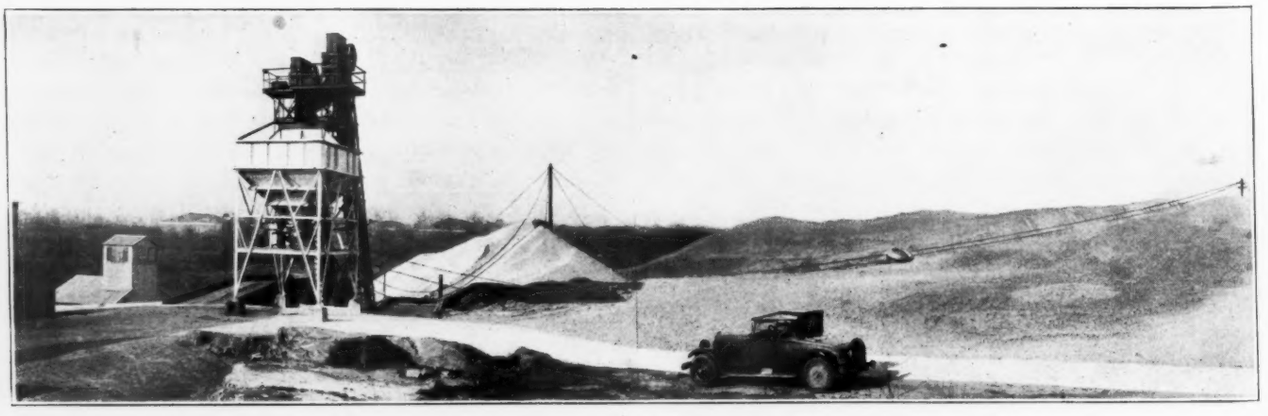
Instead of putting the resulting crushed stone on the retail market, however, the owners of the crushing plant arranged with George M. Brewster & Sons, Inc., of Bogota, N. J., to handle the entire output and distribute it to the retail trade. Accordingly the latter company put in a storage and distribution yard at Fort Lee, near the crushing plant, where the stone from the plant is stored up and later reloaded as needed for construction work in the vicinity. At the same time, the Brewster company provided facilities for handling cement and sand, making this their general material storage headquarters for concrete work in that district.

The stone is brought from the crushing plant in motor trucks which are backed up on ramps and the loads discharged into the storage area. From that point the stone is stored out over the area on a 700-ft. span by means of a 4-cu. yd. Sauerman power drag scraper. Sand likewise comes in by trucks which discharge over another ramp, and the sand is put into storage by a 2-cu. yd. Sauerman power drag scraper. The cement is stored in a warehouse on the same property, not far from the stone and sand yards.

When crushed stone and sand are to be loaded out, they are reclaimed from the storage piles by their respective scraper outfits, which discharge to reclaiming hoppers at the foot of a truck-loading plant near the ramps. This truck-loading plant, with all its conveying equipment, was installed by the Stephens-Adamson Mfg. Co. Pan feeders draw the materials from the same stone reclaiming hoppers and load into bucket elevators which lift the materials into separate compartments in the delivery hopper, whence they are loaded into trucks.

At the time the panorama photograph reproduced herewith was taken, the storage yard contained about 9,000 tons of sand and some 150,000 tons of crushed stone.

The engineering work on this storage yard was done by W. W. Blauvelt, chief engineer, and A. E. Scrivens, assistant engineer, of George M. Brewster & Son, Inc. The operation is under the direction of H. Rittman, general manager.



Crushed-stone storage and reclamation, George M. Brewster & Sons, Inc.

The Executive's View of Wastes

By B. E. WELTY*

I AM not going to talk to you about quarries in particular, but anything I say will apply to quarry operation.

The selection and training of men is, in my opinion, very important in the elimination of waste through accidents.

The selection of men as I use the term, does not necessarily mean the selection of the new employe, it applies as well to the man already employed who may be transferred to work other than that for which he was originally employed, work to which he may be unaccustomed or unfitted. Too often men are transferred from one department to another or from one job in a department to a different job in the same department, with little or no consideration of the aptitude of the man for the work.

For example: I cite a case of my own experience this year where a man with a good safety record over a period of years was transferred to a different job, and on the second day he was on the new job he wrecked the equipment he was operating and severely injured himself, a fatality being narrowly averted. What was wrong? The man was the steady, plugging, dependable type who could, no doubt, have worked safely for many years on the type of work for which he was fitted and to which he was accustomed, but by nature, he could not readily adjust himself to new conditions. The new job was such that it required him to think and act quickly, two qualifications which he did not have. In view of these facts, could you hold the man responsible for this accident? Perhaps, but I think the principal offender was the man who assigned this workman to a job he was unfitted to handle safely or efficiently.

Your supervisory force should know the operation intimately and see to it that the men are not subjected to undue danger and that the men know of those things which are considered dangerous.

If you are operating a quarry where there is a bad overhang, don't become too accustomed to it. If you can't shoot it down, at least make it a practice to inspect it daily. I saw such a working place this year and the fact that the foreman was on the job and inspected his working places regularly, saved several thousand dollars worth of loading equipment and the possible loss of many lives. One morning while inspecting this overhang, as was his regular custom, he detected a parting that appeared to be different than it had been on the previous morning, so he immediately transferred his men from this working place, removed the equipment and within a few hours with no further warning, fifteen hundred tons of rock came crashing down into the quarry, completely covering the place where the men had been working. That's accident prevention!

How do you acquaint those in the vicinity of your quarry that you are about to shoot? Failure to understand these signals by new men may very readily lead to serious accidents. Don't take for granted that the new men know all about your local practice or customs. Our records show that we have an unduly large proportion of accidents among our new men and then we jump to the very old men in point of length of employment. This to me indicated two things, first—that the new man is not accustomed to conditions and is injured through his own ignorance, or because his foreman had not properly instructed or advised him regarding the particular hazards of the jobs, and in the second case—the man has been injured because he has become so accustomed to the conditions that he does not take the necessary precautions, or his physical condition may be such that he is no longer capable of working under the conditions he has worked under safely for a long period. We should observe our men continuously and not hesitate to make changes when we find a man is no longer capable of working safely and efficiently in any location or upon any particular job.

I believe confidence and respect of the employe for his employer has a great deal to do with his attitude toward the company and its policies. These, I believe, are largely influenced by the manner in which he was employed and received into the company. Every man here remembers his first day on the job. Will you ever forget the helpful guiding hand that was given you, or the mistakes you made that an observing foreman could have prevented if he had taken the proper interest in getting you started on the job? Can you look back and see how you exposed yourself to dangers because you did not know a dangerous place from a safe place?

Let us recognize the difference between men, the difference between jobs and the difference in conditions. Then try to bring the three together, to the end that better products can be economically produced safely.

There are several things that I want to suggest as steps in this direction. First—that we have employment managers who understand the work they are employing men to handle. I don't mean that he shall be intimately familiar with each job,

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* Production manager, Pacific Division, U. S. Gypsum Co., Chicago, Ill. Presented before the 1929 meeting of the National Safety Congress.

but he should know the job sufficiently well to know the type of man who can best handle it.

Second—he should know men, be a man's man and be a lover of men. I believe the day is gone when the cold impersonal employment manager can hold a job and render a service to his employer.

Third—the safety supervisor should be as well versed in men and jobs as the employment manager and he, of all men, must be a man's man. I think the caliber of men handling the safety phase of business must be of the highest type, if we are to reach the goal to which we aspire, and let me say here, that we are only going to approach that goal when we get away from the grandstanding and put safety in its true position in business.

The statement I am about to make will displease many, but there is time reserved for discussion and it is mainly through an exchange of ideas and beliefs that we can hope to some day reach a happier plane in our accident prevention program.

I believe that "Safety First" is a poor slogan, for it is not a true or sincere statement of a fact. No one is more superstitious than a workman, no one expects to have something slipped over him like the workman and no one is as quick to detect insincerity and inconsistency. Admitting these facts, then, why do we persist in shouting, painting and preaching, "Safety First." Let us be honest and admit that we are in business to make a profit, and that our men must work safely to insure that profit. Our men are not children, they appreciate the necessity of our operating economically and that accidents are an economic waste and unprofitable to them personally. Let's take our gloves off and go after accidents like we go after the other things that penalize our costs and quality:

First—By better selection of personnel.
Second—By more thorough instruction of the new employee.
Third—By a closer and more sympathetic supervision of all men.
Fourth—By formulating as simple a set of safety rules as possible then requiring obedience of those rules.

No one will have just grounds upon which to criticise such a move.

Our company has tried a sentimental approach to safety and found it inadequate. For two years our company has considered accidents as it has its cost and quality, with the result that in 1928 we reduced our cost of accidents 38 per cent and in 1929 to-date we show a 32 per cent reduction over 1928.

National Safety Council Meets

(*Continued from page* 99)

port of the nominating committee and this was adopted without a dissenting vote. The officers elected for the coming year are: chairman, L. Worthen, vice-president and general manager, Connecticut Quarries Co., Inc., New Haven, Conn.; vice-chairman, H. F. Yotter, insurance supervisor, General Crushed Stone Co., Easton, Pa.; statistics chairman, W. W. Adams, statistician, U. S. Bureau of Mines, Washington, D. C.; publicity chairman, V. P. Ahearn, National Sand & Gravel Association, Washington, D. C.; secretary, J. R. Boyd, National Crushed Stone Association, Washington, D. C.; executive committee, all those named and R. E. Colville, manager insurance department, United States Gypsum Co., Chicago.

In "The Fundamentals in Accident Prevention as Practiced by the Wakefield Iron Co.," R. B. Wortley, the company's superintendent, told some of the methods by which he has secured no-accident records. Individual rewards for the men, varying in value with the length of the no-accident period, have been used successfully, the monetary value of the awards proving of less significance than their value as tokens of company recognition.

To Chairman Colville's question asking whether the Wakefield company's accident losses were charged against the department responsible for them, Mr. Wortley replied that they were debited to production cost without attempting to make a departmental division of them. Mr. Colville took the opportunity to show how the United States Gypsum Company handles this matter by charging these losses against the departments causing them, giving each department an accident rating, and developing figures showing the number and the cost of accidents per $100 of payroll.

The chairman then offered the suggested "Safety Manual for Quarries," embodying safety rules developed by the United States Gypsum, France Stone, and other companies, and it was decided that this manual, despite its temporary form, should be tentatively adopted and that the committee responsible for its preparation should be instructed to consider the criticisms and suggestions of members and, at the next annual meeting, deliver a progress report, embodying such changes as might seem necessary.

Wednesday afternoon was devoted to a trip by buses to the immense quarries of Dolese & Shepard about twenty miles west of Chicago's center. Here the delegates, to the number of about forty, witnessed the routine operation of the Woodford haulage system which handles the enormous daily tonnage of coarse rock from quarry shovels to crusher plants. Also a line of bench holes was blasted by the use of Loxite, the liquid oxygen explosive that is manufactured in a nearby plant by the Keith Dunham Company. The blast was perfect in every respect, completely breaking a clean line and moving many thousands of tons of rock well out onto the floor of the quarry. The party then visited the Loxite manufacturing plant and witnessed the making of the liquid oxygen and the preparation of cartridges.

Pacific Northwest Cement Manufacturers Celebrate Trophy Award to Oregon Company

PURSUANT to broadcast announcements as well as engraved invitations, a fine gathering of interested people attended the dedicatory exercises, at the unveiling of the Portland Cement Association's 1928 Safety Trophy, held in Oswego, Oregon on Thursday, September 19, 1929, with the Oregon Portland Company as host.

The celebration associated with this award began the preceding day, in Portland, Oregon, with a regional safety meeting sponsored by the Portland Cement Association and under the auspices of the cement manufacturers of the Pacific Northwest. The day was spent at the Multnomah Hotel and the following program was followed.

Morning Session, 9:30 A. M.—L. C. Newlands, Presiding

Registration.

Introduction of Mayor George L. Baker.

Address of welcome.

Introduction of delegates from various mills.

Introduction of A. J. R. Curtis, assistant general manager, Portland Cement Association.

Address by Mr. Curtis—"Progress of Safety Work Throughout the Cement Industry."

Address by Dr. W. H. MacDougall, physician and surgeon.

Address by John C. Stevens, hydraulic engineer.

Address by Dr. Wilford H. Belknap, eye, ear and throat specialist—"Eye Injuries."

Address by George B. Herington, Portland—"Accident Prevention, Looking Backward and Forward."

Address by D. K. Dalzell, electrician, Oregon Portland Cement Company—"Putting Punch in a Safety Campaign."

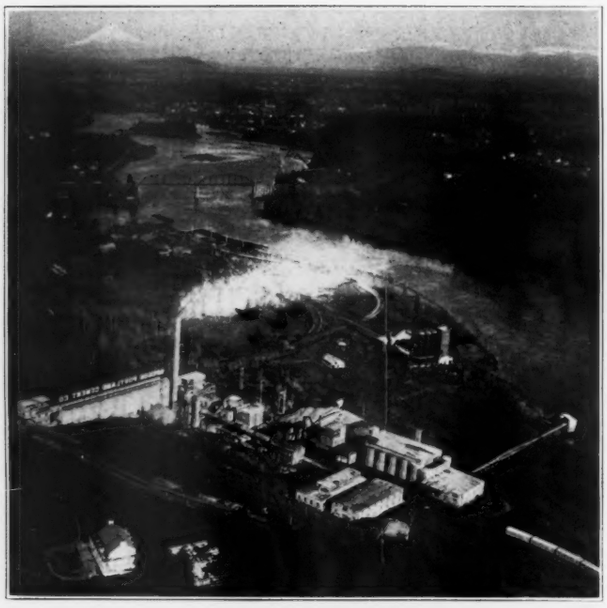
1928 Safety committee, Oregon Portland Cement Company. (Left to right) front row: H. E. Johnson, H. L. Fox, J. C. Haines, Otto Johnson, A. J. Lick; back row: H. R. Shipley, supt., Ed. Wanker, J. H. Adams, D. K. Dalzell, O. E. McCormick, Robt. Meyers, M. J. McDonald, asst. supt., D. H. Leche, general supt.

Luncheon, 12:45 p. m.

N. D. Moore, vice-president Pacific Coast Cement Company, presiding.—"Accident Prevention from the Executive's Viewpoint."

"American management is the answer to accident prevention policy," concluded Herington. "It analyzes, determines, decides, inspires and cooperates, checks results and manages its business safely in the financial and human sense, and in elimination of waste. Management must determine the cause of the reoccurrence of accidents and make

Dedication ceremony, at trophy award, Oswego, Oregon



Showing scenic suvironment of Oregon Portland Cement Company

a series of investigations and preventions in order to correct the trouble."

Afternoon Session, 2:00 P. M.

D. L. Carpenter, president, Beaver Portland Cement Company, presiding.

Address by W. H. Fitzgerald of Oregon Industrial Accident Commission.

Round table discussion—

"The Quarry"—Led by A. F. Krabbe, superintendent Olympic Portland Cement Company.

"The Mill"—Led by H. R. Shipley, superintendent Oregon Portland Cement Company, Oswego plant.

"Packing and Shipping Departments"—Led by D. C. Gloag, time keeper, British Columbia Cement Company.

First aid contest, 3:40 p. m.

Competing first aid teams from cement plants throughout the northwest.

Directed by officials of the American Red Cross and U. S. Bureau of Mines.

Safety dinner, 7:00 p. m. Chester N. Reitze, vice-president, Superior Portland Cement Company, chairman.

George M. Aitken, safety engineer, Oregon Industrial Accident Commission, toastmaster.

Dedication of safety trophy, Oswego, Oregon

This dinner was interspersed with safety songs.

Address by N. M. Sloan, safety engineer, Pacific Telephone & Telegraph Company.

The next day the program at the plant of the Oregon Portland Company at Oswego began at 2:30 with a long list of humorous field contests for women, men, girls and boys, limited to residents of Oswego and vicinity.

At 4:30 the dedicatory exercises were conducted with the following program:

Music—Jefferson High School band.

Opening remarks—L. C. Newlands, vice-president.

Presentation of trophy—A. J. R. Curtis, Manager Accident Prevention and Insurance Bureau, Portland Cement Association.

Unveiling.

Music, "Stars and Stripes Forever"—Jefferson High School band.

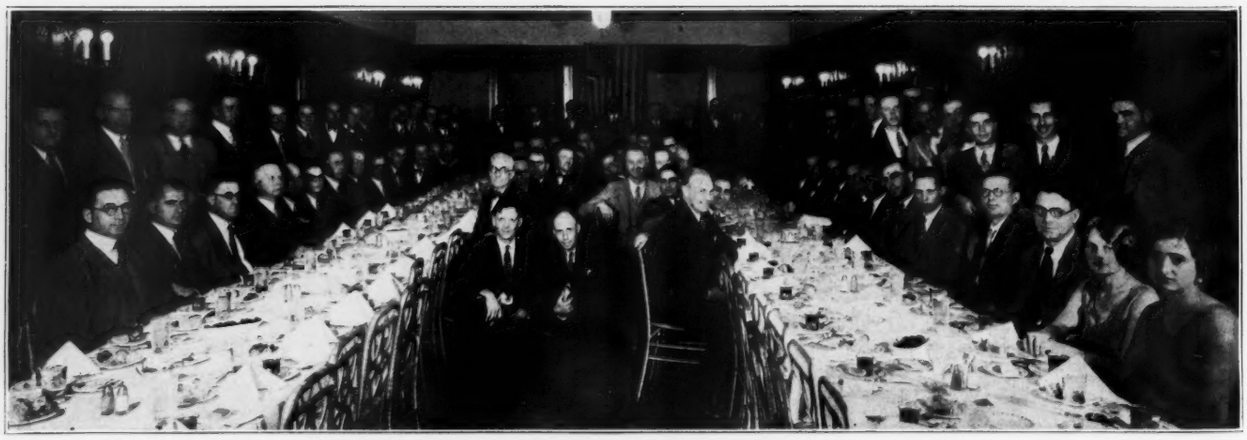
Acceptance—D. H. Leche, general superintendent.

Address of the day—Marshall N. Dana, associate editor, Oregon Daily Journal.

Closing remarks—H. L. Knappenberger, secretary.

Then followed a picnic supper at the company's club house.

The officials of the Oregon Portland Cement Company are: R. P. Butchart, president; H. A. Ross, vice-president; L. C. Newlands, vice-president and general manager; H. L. Knappenberger, secretary-treasurer and sales manager; F. E. McCaslin, assistant secretary-treasurer; H. P. Davidson, traffic manager; E. E. LeClaire, assistant sales manager; and D. H. Leche, general superintendent.



Dinner during regional safety meeting, Multnomah Hotel, Portland, Oregon, September 18, 1929

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.

© Blank-Stoller, Inc.

Col. O. P. Chamberlain
Vice-president and general manager
Dolese & Shepard Company
Chicago, Illinois

PERSONAL MENTION

L. B. McMillan, general consulting engineer for Johns-Manville Corporation, was killed recently when his private airplane crashed near Newark, N. J. He held degrees in mechanical engineering, chemical engineering, and master of science, and was a member of several national engineering societies. He was interested particularly in heat insulation, a subject in which he had conducted notable research.

H. A. Brassard, a staff member of the Portland Cement Association general educational bureau and a frequent contributor to the columns of PIT AND QUARRY, resigned his position with the association in September to return to his former home at Spokane, Wash. Prior to his arrival in Chicago, Mr. Brassard was engaged in newspaper work on the Pacific coast. For a time, before his appointment to the Portland Cement Association staff, he was engaged with the advertising department of Sears Roebuck. He made his trip to Washington overland, and, following a short stay in Spokane, plans to leave with Mrs. Brassard for a home in the Washington Rockies. He contemplates a free-lance writing career in the hills of his native state for the next year or two.

Joseph W. Eshelman has been made representative in the Birmingham, Ala., district for the Pennsylvania Pump and Compressor Company of Easton, Pa. His office is in the American Traders Bank Bldg.

W. C. Carter, formerly vice-president in general charge of production at all Link-Belt Company's plants, has assumed the duties of vice-president and general manager of the Chicago plant.

R. L. Vance, Denver, Colo., has been elected vice-president of Monolith Portland Midwest Company, and will have general charge of operations in Midwestern territory. He has been engaged in the cement industry for nineteen years and was an executive of the Monolith Portland Cement Company.

Hibbard S. Greene, former vice-president and director of the Barber-Greene Company, of Aurora, Ill., has been appointed assistant to the president of Chain Belt Company. He will coordinate the marketing plans of the Chain Belt Company, Sivyer Steel Casting Company, Federal Malleable Company and the Interstate Drop Forge Company, all of Milwaukee, Wis., as well as The Stearns Conveyor Company of Cleveland, Ohio, the latter company being a division of the Chain Belt Company. The same financial interests control the above four companies. A wide range of products will be covered in the plan. His headquarters will be at the Milwaukee plant.

James R. Fairman has been appointed manager of the eastern offices of The Portland Cement Association with headquarters at 347 Madison Ave., New York City, succeeding **B. H. Wait**, resigned. Mr. Fairman is a graduate of the University of Missouri, and was engaged in bridge designing and general engineering work in Kansas City and vicinity for several years. He was a Major of Engineers, U. S. Army, during the World War. He joined the field staff of the Association at Kansas City in 1919 and was appointed district engineer in charge of the Birmingham, Ala. office in 1923. Since December 1, 1925, he has been manager, Southeastern Offices, Atlanta, Ga., and will continue to supervise Association activities in the Southeast in addition to his new duties at New York.

Jerry McLeod, a former newspaper man of Tampa, has been elected president of the Cottondale Lime Rock Company, a subsidiary of the Marianna Lime Company, says the Marianna *Times-Courier*.

Don E. Little is manager of the L. A. Snow Company, 134 International Right of Way, Spokane, Wash., that has been appointed distributor of Trackson and McCormick-Deering tractors in that district.

W. C. Stevenson is chief engineer and a director of Port Stockton Cement Company, San Francisco, Cal.

Statement of Ownership

PIT AND QUARRY

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of PIT AND QUARRY, published bi-weekly at 538 S. Clark Street, Chicago, Ill., for October 1, 1929. State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared V. E. Larsen, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Complete Service Publishing Co.; Editor, A. J. Hoskin; Managing Editor, A. J. Hoskin; Business Manager, V. E. Larsen.

2. That the owners of 1% or more of the total amount of stock are: H. W. Baumgartner, I. A. Baumgartner and V. E. Larsen, all of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

V. E. LARSEN,
Business Manager.

Sworn to and subscribed before me this 23rd day of September, 1929.
(Seal.)

M. J. STANTON.

(My commission expires December 8, 1930.)

FINANCIAL NEWS
CORPORATE & BUSINESS

The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of PIT AND QUARRY, for which no responsibility in any way is to attach to this magazine or to any of its staff.

Dufferin Paving & Crushed Stone, Ltd.

The Financial Counsel, Montreal said, on September 24, it was estimated that the company's net income for the year to date was running at a rate of something better than $5 per share on the outstanding common stock, after allowance for the usual prior charges. The company was reported to be free of bank loans, in spite of the fact that during the past two months it had been at the year's peak of operating activity.

A dividend of $1.75 a share on the first preference stock was recently declared payable on October 1, to holders of record September 16. On July 1, 1929 a dividend of $2.33 a share, for the four months ending June 30, was paid on the first preference stock.

This company was incorporated in Ontario this year, to acquire the business of the Constructing and Paving Co. of Ontario, Ltd., and Dufferin Construction Co., Ltd., and its subsidiaries: Hagersville Quarries, Ltd., Kirkfield Crushed Stone, Ltd., Innerkip Quarries, Ltd., St. Mary's Crushed Stone, Ltd., and Blue Lake Sand and Gravel, Ltd.

The company has no funded debt and has outstanding $2,000,000 seven per cent cumulative convertible 1st preferred stock, $1,250,000 six per cent non-cumulative convertible 2nd preferred, both $100 par, and 60,000 shares of no par common stock.

The latest available balance sheet is of January 1, 1929.

Recent Toronto advices to the Montreal *Daily Star* said that negotiations for a merger of Dufferin Paving and Crushed Stone, Ltd., Canada Paving and Supply Corp., and Standard Paving Materials, Ltd., had been declared off for the time being at least, if not indefinitely. Negotiations progressed favorably up to the point of terms, the despatch said, but it was at that stage that obstruction was met. Two of the three companies were not willing to concede the price asked by the third and after further discussion the company in question would make no concession.

General Asphalt's August Net A New Record

General Asphalt's expected improvement in business in the second half-year is being realized with the August net of around $350,000 setting a new record despite the fact that paving was far below normal.

July's contribution to profits was around $225,000 and with paving business improving in September and volume in other lines maintained, third quarter net of around $800,000 is expected.

With the completion of Asphalt's plan of recapitalization, having already been approved by the stockholders, the common shares will constitute the sole capital obligation. The 6 per cent convertible bonds are being retired and convertible preferred will be paid off December 23. Much of the latter undoubtedly will be converted into common. Funds for meeting the retirement outlays will accrue from the one-for-three subscription rights to additional common at $50 which will be paid in the treasury by November 27. Large banking interests have guaranteed the cash retirement of preferred and conversion into common and have underwritten the common subscriptions.

Asphalt's first half-year is usually the smaller of the two. This year it showed a net balance equal to $1.41 a share on the 210,614 shares of common then issued, compared with a net loss of $339,241 in the first half of 1928.

Save for smaller paving income, occasioned by delay in starting some municipal work, the various departments have shown a good volume of business with better price levels through the summer. Roofing and flooring departments have had a good season and it is expected that the paving business will pick up before the winter sets in.

The treasury position has been on the upward trend, Asphalt recently having about $6,000,000 of net current assets, $2,000,000 of this in cash.

Pennsylvania Salt Manufacturing Co.

This company has just issued its annual report for the year ended June 30, 1929. It is given below and compared with the same report for last year.

Years ended June 30	1929	1928
Gross earnings	$3,030,938	$2,638,968
Maintenance	529,938	547,763
Depreciation and depletion	677,057	662,640
Research and development reserve	100,000	.....
Federal tax	222,004	118,111
Neat earnings	$1,495,940	$1,240,454
Earned per share (150,000 shares)	$9.97	$8.27

The usual strong financial condition is shown with a current ration of 5.3 to 1, working capital amounting to $3,322,000.

Cash alone of $1,365,704 is in excess of current liabilities of only $772,765, the latter including no bank loans. Inventories stood at $1,551,000, while surplus during the year was increased by $771,000 to $6,348,151. Trade marks and patents were carried at only $179,000. The only outstanding security is 150,000 shares of capital stock, $50 par value.

The stock sells for around 112 on the Philadelphia Stock Exchange, at which price a yield of 5.3 per cent is returned from total dividends of $6 annually, $5 of the rate being regular payments and $1 extra. Good progress has been shown by the company, for earnings have shown a gain over the preceding period for every year since 1924, while dividends have been paid continuously since 1863, never at a rate of lower than $4 a share, the present $5 a share having been in effect since 1924.

Leslie California Salt Co.

This company has just published its annual report for the fiscal year ended June 30, 1929. The company operates two refineries in California, having an annual capacity of approximately 210,000 tons.

Years ended June 30	1929	1928
Net before federal tax	$296,541	$194,541
Earned per share after estimated federal tax	$2.25 (116,520 shares)	$2.13 (80,816 shares)

It will be recalled by those who have been following the financial affairs of the Leslie California Salt Co. that on December 1, 1928 the company retired the balance of its first mortgage 6 per cent bonds, outstanding at $1,225,000. A balance sheet as of June 30, 1929, showed total resources

of $4,535,000 of which current assets of $689,000 compared with current liabilitities of $151,000. Cash amounted to $114,000, receivables to $249,000 and inventories to $326,000. Real estate, buildings, machinery and equipment, after depreciation was valued at $3,440,000. Capitalization was represented by 116,520 no par common shares with a carrying value of $3,448,000 and an equity in capital surplus of $151,000 and in earned surplus of $246,000.

In a recent letter to the stockholders, the management calls attention to an undesirable competitive condition, which may arise in the salt industry. At present this is a potentiality only, but should the matter develop in a manner prejudicial to the company, it would be necessary to take such action as will best protect the interest of Leslie California. The management evidently refers to the competition of the new Alviso Salt Works.

Alpha Portland Cement Applies to List Common Stock

This company announced on September 26 that it had applied to the New York Stock Exchange to list 71,000 shares of its no par common stock. The common was previously listed on the New York Curb Market and the recent market action of the stock coupled with the overproduction and price-cutting competition in the industry indicate that Alpha is not experiencing as profitable a year as 1928 proved to be. In spite of a decline in shipments, the company was able to increase its net income 9.6 per cent last year, or from $2,359,286 in 1927 to $2,585,535 in 1928. This was brought about through a reduction in operating costs.

During the year, however, the Phoenixville, Ala., property of the Phoenix Portland Cement Corp. was taken over, in connection with which 118,500 shares of unissued common stock were sold. The present capitalization of the company is as follows.

No par common.. 711,000 shares
7% preferred....$2,000,000

The common has paid $3 dividends annually since July 1926.

On the basis of that number of shares the net income in 1928 was equal to $3.44 per common share, as against $3.74 per share outstanding December 31, 1927. Inasmuch as it has been the policy of the company in the past to maintain a strong financial position and since it would not be surprising if the $3 divided rate were not entirely earned this year, a reduction in the rate would not be an unlikely development.

The company's net income since 1922 is given below:

1928	$2,585,535
1927	2,359,286
1926	2,603,498
1925	3,858,246
1924	3,085,851
1923	3,028,399
1922	1,617,359

The company's financial and trade strength make it seem one of the most likely to recover earning power very rapidly as soon as the industry becomes stabilized. Alpha Portland Cement Co. owns eight plants and leases two others, with a total annual capacity of 12,500,000 barrels, and also owns well-situated limestone properties. The company has spent large sums of money annually for many years past on improvement of plants and these improvements are now operating to reduce the cost of production.

At the close of last year the balance sheet showed total current assets of $10,336,088, including $6,743,964 cash, marketable securities and call loans, against only $1,432,403 current liabilities. Net working capital rose almost a million dollars from the year before.

CURRENT DIVIDENDS

COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE
Alpha Portland Cement	Common	$.75 Qr.	Sept. 25	Oct. 15
Atlas Portland Cement	Preferred	$.66⅔ Qr.	Sept. 21	Oct. 1
American Aggregates Corp	Preferred	1¾% Qr.	Sept. 20	Oct. 1
American Brick Co	Preferred	$.50 Qr.	Oct. 25	Nov. 1
Bessemer Limestone & Cement	Class A	$.75 Qr.	Oct. 20	Nov. 1
Boston Sand and Gravel	Preferred	$.87½ Qr.	Sept. 22	Oct. 1
Boston Sand and Gravel	Common	$.40 Qr.	Sept. 22	Oct. 1
Bloomington Sand and Gravel	Preferred	1¾% Qr.	.....	Nov. 1
Bloomington Sand and Gravel	Common	$.07½	.....	Nov. 1
Calaveras Cement Co	7% Pfd.	1¾% Qr.	Sept. 30	Oct. 15
Canada Cement Co	6½% Pfd.	1⅝% Qr.	Aug. 31	Sept. 30
Canada Gypsum and Alabastine	New Stock	$.37½ Qr.	Sept. 14	Oct. 1
Cleveland Bl'drs Supply & Brick	Common	$.50 Qr.	Sept. 22	Oct. 1
Consolidated Oka Sand and Gravel	Preferred	1¾% Qr.	Sept. 27	Oct. 2
Construction Materials	Preferred	$.87½ Qr.	Oct. 19	Nov. 1
Coronet Phosphate Co	.....	$2.00 Qr.	Sept. 14	Oct. 1
Dolese and Sheperd	.....	$2.00 Qr.	Sept. 20	Oct. 1
Dufferin Pav. & Crushed Stone	7% 1st pfd.	1¾% Qr.	Sept. 16	Oct. 1
Ideal Cement Co	Common	$1.75 Qr.	Sept. 13	Oct. 1
Illinois Brick	.....	$.60 Qr.	Oct. 1	Oct. 15
International Salt Co	.....	1½% Qr.	Sept. 16	Oct. 1
International Cement	Common	$1.00 Qr.	Sept. 11	Sept. 28
Johns Manville	Preferred	1¾% Qr.	Sept. 10	Oct. 1
Johns Manville	Common	$.75 Qr.	Sept. 24	Oct. 15
Kelley Island Lime and Tr	.....	$.62½ Qr.	Sept. 20	Oct. 1
Kentucky Cons. Stone Co	Preferred	1¾% Qr.	Oct. 15	Nov. 1
Kentucky Rock Asphalt	Common	$.40 Qr.	Sept. 15	Oct. 1
Laclede Clay Products	Preferred	1¾% Qr.	Sept. 29	Oct. 1
Lawrence Portland Cement	.....	2% Qr.	Sept. 15	Sept. 29
Lehigh Portland Cement	Common	$.62½ Qr.	Oct. 13	Nov. 1
Lehigh Portland Cement	Preferred	1¾% Qr.	Sept. 14	Oct. 1
Limestone Products	7% Pfd.	1¾% Qr.	Sept. 15	Oct. 1
Medusa Portland Cement	Preferred	1½% Qr.	Sept. 25	Oct. 1
Medusa Portland Cement	Common	$1.50 Qr.	Sept. 25	Oct. 1
Metropolitan Paving Brick	Preferred	1¾% Qr.	Sept. 15	Oct. 1
Mineral Products Co	Pfd. "A"	$.20 Qr.	Sept. 30	Oct. 1
Missouri Portland Cement	.....	$.50 Qr.	Oct. 19	Nov. 1
Pacific Clay Products	.....	$.60 Qr.	Oct. 20	Nov. 1
Pennsylvania Salt	Common	$1.25 Qr.	Sept. 30	Oct. 15
Pennsylvania Salt	Common	$1.00 extra	Sept. 30	Oct. 15
Santa Cruz Portland Cement	.....	$1.00 Qr.	Sept. 24	Oct. 1
Sterling Salt	Common	$.50 Qr.	Sept. 24	Oct. 1
Superior Portland Cement	Class A	$.27½ M	Oct. 23	Nov. 1
United States Gypsum	Preferred	1¾% Qr.	Sept. 14	Sept. 30
United States Gypsum	Common	$.40 Qr.	Sept. 14	Oct. 1
Warner Co	1st Pfd.	$1.75 Qr.	Sept. 14	Oct. 1
Warner Co	Common	$.50 Qr.	Sept. 30	Oct. 15
Warner Co	Common	$.50 extra	Sept. 30	Oct. 1
Worcester Salt Co	Common	1¼% Qr.	Sept. 24	Sept. 29

Asbestos Corporation

On September 24, 1929, Montreal advices to the Toronto *Mail and Empire* said it was understood that plans had been called off for linking up a number of independent asbestos companies with this corporation. This was due to the decision of Keasby-Mattison interests not to proceed further with the merger at present.

Canada Gypsum and Alabastine, Ltd.

The Toronto Stock Exchange listed 450,876 shares of this company's no par common stock on September 27, 1929. The stock had already been listed and admitted to trading on the Montreal Stock Exchange.

Canadian China Clay Co., Ltd.

Under date of September 14, 1929, notice was given that a meeting of holders of first mortgage 6 per cent sinking fund gold bonds of Canadian China Clay Co., Ltd., would be held on October 14 at the office of the National Trust Co., Ltd., trustee, at Montreal, to consider and approve the offer made by R. A. Bryce to purchase certain property comprised in security of the mortgage.

Granite Mills

A dispatch just received from Fall River, Mass., said that an offer of $85,000 for the company's plant, or $10,000 more than the sum specified in the petition presented to the Superior Court for sale of the mill to Russel H. Leonard, of the Peperall Manufacturing Co., was made by Frank M. Silvia, attorney, in behalf of a Boston syndicate headed by Frank Gross.

LEGAL INFORMATION FOR OPERATORS

Injunction Against Operation of Quarry Not Granted

In many instances the Courts have restrained and stopped operations of stone quarries, in legal procedures charging nuisances, when in fact had the case been properly presented, the operations may have been only restricted instead of restrained.

For instance, in Jones v. Kelley Trust Co., 18 S. W. (2d) 356, it was disclosed that a rock quarry and crusher are located and operated within the corporation limits of a city. A property owner filed suit asking the Court for an injunction against operation of the quarry because small rocks and debris were thrown on his property, thus endangering the lives of his family.

The lower Court held that since the city commission had granted a permit to operate the quarry and rock crusher, the owner may continue to operate his quarry if the noise incident to the operation and the danger of hurling rocks were reduced to the lowest possible terms so as to safeguard the nearby property owners and their families. The latter appealed to the higher Court, contending that a complete injunction should be issued to stop further operation of the quarry.

However, it is interesting to observe that the higher Court upheld the lower Court's decision, thus merely restricting the operation of the quarry, saying:

"Operating a quarry and rock crusher may or may not be unlawful, depending upon the circumstances in each particular case. What might be a nuisance done in one place would not necessarily be a nuisance done in a different place. The locality is to be considered in determining whether there is a nuisance, although it is not conclusive, but it is to be considered in connection with all circumstances in the case. There are some nuisances in which the act complained of may be wrongful, but constitutes a nuisance only by reason of its location, and there may be an act or condition that is rightful, or even necessary, but may become a nuisance by reason of its location. What might be a nuisance in one locality might not be so in another. A business which might be perfectly proper in a business or manufacturing neighborhood, may be a nuisance when carried on in a residential district, and, conversely, a business which might well be considered a nuisance in a residential portion of a city or village may be proof against complaint when conducted in a business or manufacturing locality. . . . Every person is entitled to the undisturbed possession and enjoyment of his own property. The mode of enjoyment is necessarily limited by the rights of others; otherwise, it might be made destructive to their rights altogether. . . . We think the chancellor was therefore correct in permitting the appellees (owner of quarry) to operate only on condition that they did not throw stones on the lands of appellants and did not do anything that injured or damaged the appellants or their families."

Duty of Employer to Furnish Safe Appliances

The law is well established that it is the legal duty of an employer to provide as reasonably safe working place as the circumstances will permit. Furthermore, he is legally bound to know that the premises, machines, tools and appliances are free from apparent defects which are likely to cause injury to the employes.

On the other hand, an employer is not an "insurer" against injuries sustained by his employees. If it can be shown to the satisfaction of the Court that an injured employee was grossly negligent in not taking the proper precautions to protect himself against injury, or that the danger was readily apparent, the employer is not liable in damages.

This phase of the law was thoroughly considered by a higher Court in the recent case of Richardson v. Southern Surety Co., 139 S. E. 839. In this case an employee, who was engaged in loading rock, was instructed by his foreman to burst these large rocks with a sledge hammer furnished him for that purpose. When he struck a large rock with this hammer, a piece of the rock flew up and hit him in the eye.

The employee sued his employer for damages, alleging that the latter failed to furnish him with goggles or wire screens for the protection of his eyes, and that such failure was negligence, causing the injury.

However, the Court held the employer *not* liable, because the danger of breaking rock without eye protectors was readily apparent to the workman, who was contributorily negligent in subjecting himself to the known hazard. The Court said:

"Upon the facts of this case, it cannot be held that it was the duty of defendant (employer) to furnish such goggles or wire screens to plaintiff (employee) for his protection while engaged in the work for which he was employed. Plaintiff's (employee's) injury, upon all the evidence, was due to an accident, and was not caused by any negligence of the employer."

The Law of Injuries Caused by Blasting

It is important to know that there is a distinction between liability for injuries caused by blasting on one's own property and that of another.

Generally speaking, a person is liable for all damages effected others by blasting on his own property, but he is liable only for injuries *negligently* caused when blasting on property owned by another, particularly if such blasting is for the purpose of improving the latter's property.

In the case of Gibson v. Womack, 291 S. W. 1001, it was shown that a person who was blasting rock on the property of another carefully prepared the charge. However, stone was caused by the blast to roll down a hill and effect injury to a pedestrian. The latter sued for damages as a result of the injury.

In holding the pedestrian *not* entitled to damages, the Court explained the law as follows:

"We think that, according to the best-considered decisions, the rule is that if one, in blasting upon his own lands, invades the premises of his neighbor, by throwing stones and debris thereon, he is liable for the resulting injury; but for any other injury, such as may result from the mere concussion of the atmosphere, sound, or otherwise, there is no liability, unless it is shown that the work was done negligently, and that the injury was the result of negligence, and not the result of blasting according to the usual methods and with reasonable care."

Generally speaking, a person is liable for all damage effected adjoining property, while blasting on his own land, where such damage is caused by throwing rock, dirt or other debris thereon. However, he is not liable if the damage results from concussion of the atmosphere, or the like, unless he *negligently* causes the injury.

For example, in the recent leading case of Henry Hall v. Sundestrom, 139 N. Y. 391, where this point of the law was involved, the Court said:

"Blasting upon one's own premises or upon the premises of another, with permission of the owner, if necessary for the improvement thereof, is not an unlawful act. Such blasting necessarily causes vibration of the earth and air to a greater or less extent. Such vibrations cannot be confined into inclosed limits. Hence it must follow that if rightfully and not *negligently* caused, even though consequential injuries result therefrom, the sufferer is without remedy. . . . But when the results of blasting are not consequential but direct, when dirt and stones are cast upon the premises of another, so that there is an actual physical invasion thereof, the question of negligence or want of skill is wholly immaterial."

When Punitive Damages Are Allowable

Sometimes the Courts will allow punitive damages greatly in excess of the injury actually sustained by the complaining party. However, in Perry v. Kelford, 146 S. E. 805, the Court clearly explains the law on this subject, as follows:

"Punitive, vindictive or exemplary damages, sometimes called smart money, are allowed in cases where the injury is inflicted in a malicious, wanton and reckless manner. . . . 'Punitive damages are never awarded, except in cases when there is an element either of fraud, malice, such a degree of negligence as indicates a reckless indifference to consequences, oppression, insult, rudeness, caprice, wilfulness, or other causes of aggravation in the act of omission causing the injury.' . . . Punitive damage is not a matter of right, but a matter of discretion of the jury."

Necessary to Carefully Guard Explosives

Operators of quarries and rock crushers should, at all times, keep explosives in securely locked rooms, or other locations, safe from children or other persons who by chance may obtain possession of it.

For illustration, in Kansas City v. Robinson, 17 S. W. (2d) 977, a city ordinance required all users of explosives to obtain a permit and furnish a bond guaranteeing to "pay any and all damages caused any person by the use thereof."

A person, who was blasting within the city limits, obtained a permit and furnished the required bond. He negligently left dynamite caps in an unlocked basement room used by employes of a nearby plant. Some children entered the basement and took the caps not knowing the danger. Later one of them was seriously injured when a cap which he was holding in his hand exploded. His parents sued the operator of the plant who attempted to avoid liability on the contention that the children were trespassers and not permitted to enter the basement. However, the court held the child's parents entitled to damages, saying:

"The dynamite caps were temporarily placed in the basement overnight, but they had not been taken from the work, for they were still connected with it and thus were in use, as much so within the scope of the ordinance and the bond as though they had been left at the actual place of work. . . . They should not only have anticipated that immature children were likely to go to the unguarded and unlocked basement, . . . but they should especially have anticipated that immature children were likely to prowl thereabout and find the explosives negligently left in the basement."

Company Liable for Contract Made by Foreman

Generally speaking, an employee cannot enlarge the actual authority without assent or acquiescence on the part of his employer. However, the latter's rights and liabilities, as to third persons, are not affected by any *apparent* authority which his agent has conferred upon himself simply by his own representations, express or implied.

In other words, the liability of an employer for the acts or contracts made by employees is determined not merely by what was the apparent authority of the agent, but by the evidence which indicates whether the complaining party exercised reasonable care and prudence.

For example, in Pittman Co. v. Ellis, 147 S. E. 420, the owner of a motor truck applied for a rock-hauling contract. He was referred to a man named Pittman, secretary and treasurer of the company, who had authority to enter into employment contracts. Pittman referred the owner of the truck to his foreman stating that any contract or agreement he made with Mr. Malone was perfectly all right. The foreman promised to pay ninety cents an hour "so long as the hauling job lasted."

After the owner of the truck had hauled nine days the foreman discharged him without justification, and the truck owner sued to recover the profits he should have earned.

The company attempted to avoid liability on the contention that a contract made by the foreman was invalid. However, it is interesting to observe that the court held the company liable, saying:

"Insofar as appears from the record he (Pittman) was in sole charge . . . and had power to enter into the alleged contract. If he authorized his foreman to make the hauling contract, the company was bound by such contract."

Be Careful Where You Pile Material

It is well established that an employer invariably is held liable in damages for injuries sustained by others, as a result of his employees' negligence or carelessness. A very common source of litigation involves children who are injured while playing or walking over materials which are stored or stacked near a place where they are accustomed to play.

For instance, in Berg v. Gosling, 297 S. W. 112, it was disclosed that an employer fenced off certain property to prevent the children from playing on rock near a school house. However, his employees piled some of the material on the school property for temporary storage.

Several days later, when two small boys were playing on the material, it fell upon one of the lads killing him instantly. Legal proceedings were instituted by the boy's parents for damages.

The court held the employer liable, and said:

"The evidence shows that defendant knew of all the conditions present, and the evidence shows the inclination of children to go upon such material as he left on the children's playground in a position so that the weight of two small boys would tip it over."

Moving Expense Is "Material and Labor"

In Cincinnati Quarries Co. v. Hess, 162 N. E. 685, litigation developed over the expenses of moving equipment such as engines and rock crushers.

It was contended that since the mover had supplied labor, when moving the equipment, this fact entitled him to payment under bonds, mechanic's lien statutes and ordinances which authorize payment for "material and labor." However, the court held the rental charges and expense of moving the appliances not included by this term, and said:

"The claim for . . . the cost of moving the same, and not for human labor furnished by them."

TRAFFIC NEWS AND COMMENT

Rates on Slag to Willoughby, Maryland

In Trunk Line Association Docket 21721, a shipper proposes that the following rates be established on slag, crude or crushed, in bulk, to Willoughby, Maryland, claiming as a reason that the proposed rates are comparable with the rates now in force to Hillsboro, Maryland:

From	To Willoughby, Md. Proposed
Coatesville, Pa	125
Swedeland, Pa.	150
Pottstown, Pa.	160
Birdsboro, Pa.	160
Reading, Pa.	160

Bituminous Asphalt Rock

Shippers of bituminous asphalt rock have asked for reduction in rates from Bowling Green, Garfield, White Plains, Rockport, Big Clifty, Summit and Black Rock, Ky., to destinations in Illinois, Indiana, Southern Michigan, Ohio, Western Pennsylvania and Western New York. The through rates involving substantial reductions to the states mentioned are now being given consideration by the carriers.

The following are typical of present and proposed rates:

To	Present Rate	Proposed Rate
Quincy, Ill.	349	330
Decatur, Ill.	277	280
Freeport, Ill.	373	360
Chicago, Ill.	349	330
Bloomington, Ill.	288	310
Terre Haute, Ind.	277	270
Indianapolis, Ind.	309	270
Michigan City, Ind.	370	310
Ft. Wayne, Ind.	330	300
Richmond, Ind.	320	280
Columbus, Ind.	309	240
Grand Rapids, Mich.	477	340
Cadillac, Mich.	590	370
Bay City, Mich.	477	370
Detroit, Mich.	415	350
Jackson, Mich.	415	330
Columbus, O.	333	300
Toledo, O.	375	330
Cleveland, O.	385	340
Portsmouth, O.	333	310
Youngstown, O.	415	310
Pittsburgh, Pa.	457	360
Erie, Pa.	467	370
Buffalo, N. Y.	467	410

Rates on Cement to Oklahoma

Southwestern Freight Bureau Docket 18396 covers shipper's proposal for new interstate rates on cement into Oklahoma.

Shippers ask the carriers to establish the following rates in cents per 100 lbs. on cement, carloads, minimum wt. 50,000 lbs. (except where maximum capacity of car used is less, the actual weight, but not less than 40,000 pounds, will apply) from points shown on the following page to Redmoon and Reydon, Okla.

From Bonner Springs, Sunflower, Kan., Kansas City, Sugar Creek, Mo., 24½c; Dewey, Okla., Independence, Fredonia, Chanute, Humboldt, Iola, Mildred, Kincaid, Ft. Scott, Kan., 20½c; Ada, Okla., 18½c; Superior, Nebr., 25c. The proposed rates are based upon western cement scale, applying between Scale III and Scale IV territories. Rates were originally established based upon Scale IV, but shippers have requested reduction to basis proposed.

Rates on Slag From Hamilton, O., to Destinations in Ohio

In Central Freight Association Docket 22709, a shipper asks that the rates on slag (a product of iron and steel blast or open hearth furnaces) from Hamilton, O., to various stations on the Norfolk & Western Railroad be reduced to the following figures:

To	Proposed
Clare, Ohio	76
Newton, Ohio	76
Ancor, Ohio	76
Perintown, Ohio	76
Gernon, Ohio	76
Batavia, Ohio	92
Afton, Ohio	92
Williamsburg, Ohio	92
Eastwood, Ohio	104
Bodman, Ohio	104
Mt. Oreb, Ohio	104
Sardinia, Ohio	104
Macon, Ohio	104
Winchester, Ohio	104
Seaman, Ohio	122
Lawshe, Ohio	122
Peebles, Ohio	122
Mineral Springs, Ohio	122
Rarden, Ohio	122
Youngs, Ohio	142
Otway, Ohio	142

Rates on Plaster and Plaster Articles

In New England Freight Association Docket 17805 a shipper proposes the following reduction:

Plaster and plaster articles, viz: Blocks, gypsum or plaster; gypsum, ground; lime, common hydrated, quick or slaked, when shipped in mixed C. L. with other commodities named; plaster, calcined (plaster of paris), fireproofing, land, stucco or wall; Group A Plaster board, Group B straight or mixed (see note), C. L., min. wt. 40,000 lbs.

Note—Mixed C. L. will be charged at the actual weight and at the applicable C. L. rate for each of the respective commodities in straight C. L., subject to a min. wt. of 40,000 lbs. for each mixed C. L., deficit in the min. wt., if any, to be paid for at the rate on plaster C. L.

To	Group A Pres.	Group A Pro.	Group B Pres.	Group B Pro.
Woodstock, Vt., from Boston, Mass.	25	20	25	23
Woodstock, Vt., from Portsmouth, N. H.	24	20	26	23

The shippers claim that they are entitled to lower rates and assert that these rates are comparable with those now published by other New England lines.

Reductions to additional points are sought under Docket 17806 and are also claimed to be in line with the rates now published to other New England points.

Plaster and plaster articles, viz.; Blocks, gypsum and plaster, Group A, board, plaster; Group B, gypsum, ground; Group A, lime, common hydrated, quick or slaked (Note 1); Group A, plaster, calcined (plaster of paris, fireproofing, land, stucco or wall); Group A, straight or mixed (Note 2), min. wt. 40,000 lbs., from Boston, Mass., and Portsmouth, N. H., to stations on the B. & M. R. R., representative rates shown below:

Note 1—Applies only when in mixed C. L. with the other commodities named herein.

Note 2—Mixed C. L. will be charged at the actual weight and at the applicable C. L. rate for each of the respective commodities in straight C. L., subject to a min. wt. of 40,000 lbs. for each mixed C. L., deficit in the min. wt., if any, to be paid for at the rate on plaster, C. L.

To	From Boston, Mass. A Pres.	A Pro.	B Pres.	B Pro.
Danvers, Mass.	10½	8	10½	9
Greenville, N. H.	15½	12	15½	13
Peterboro, N. H.	16½	12	16½	14
Schuylerville, N. Y.	24	15	24	18
Westminster, Vt.	17	13	17	14

To	From Portsmouth, N. H. A Pres.	A Pro.	B Pres.	B Pro.
Danvers, Mass.	13½	10	13½	11
Greenville, N. H.	17½	13	17½	15
Peterboro, N. H.	17	13	17	14
Schuylerville, N. Y.	24½	15	24½	18
Westminster, Vt.	19½	15	19½	17

Unloading Limestone in Transit

Officials of the C. R. I. & G. railroad propose to establish privilege of unloading in transit carload shipments of agricultural limestone between stations in Texas on their railroad at charge of $6.30 per car.

When shipments are handled by special train the minimum charge for stopping to be $63.00, however, shippers have option of paying $63.00 for ten cars or less or having less than ten cars distributed by local train at rate of $6.30 per car.

This subject is covered by Texas-Louisiana Tariff Bureau Docket 139-TX.

Soapstone Refuse and Soapstone Dust

Shippers of Soapstone Refuse and Soapstone Dust at Henry, Va., are asking that their rates to stations on the C. & O. Railway in West Virginia be revised in line with the rates from Schuyler, Va. Southern Freight Association Docket 47096.

REVIEW OF FOREIGN PRACTICE

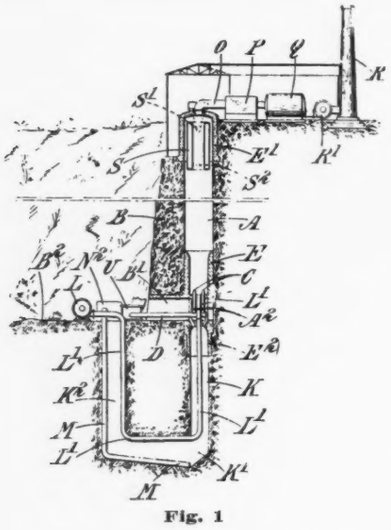


Fig. 1

Burning Cement in Dust Form

In the process of burning cement in dust form, requiring no subsequent grinding, the general principle involved consists of allowing the powdered slip to fall through a shaft through which burning gases flow in the reverse direction. The slip must be completely burnt when it hits the bottom of the shaft. The height of the shaft must be between 150 and 300 feet, depending on the size of the slip particles, if a straight fall is used. The cost of such a shaft is excessive, but Fig. 1 shows a shaft in England about 300 feet high hewn out of the side of a cliff, to get the necessary difference in level. The hottest section near the bottom is lined with fireproof material. The fuel and air for combustion are introduced at the lower level, the air first being heated by the sintered finished cement which is cooled in the process. The hot gases emerging from the top give up their heat to a waste heat boiler. The raw slip has a lower specific gravity than the sintered particles.

Fig. 2 shows a much lower shaft, in which sufficient time for complete sintering is obtained by imparting a helical motion to the descending slip. This effect is obtained by blowing the slip tangentially into the top of the kiln. In this kiln the slip is not completely sintered on reaching the bottom, and requires a small auxiliary sintering kiln to complete the process. Another kiln effecting sintering of powdered slip to powdered cement is shown in Fig. 3. Here the gases move in the same direction to the slip, and a thoroughly sintered product results. However, the waste gases are at a higher temperature and the fuel economy is not as satisfactory as in the other types. At the same time, burning powdered slip directly to powdered cement is quite feasible. Schirm (*Zement*, August 15, 1929).

Effect of Fire on Building Stones and Mortars

While all crystalline rocks undergo permanent elongation after heating and cooling, sandstones and two of the limestones suffer contraction. Very careful selection is necessary in combining the various building stones for decorative effect if the requirements of fire resistance are to be considered. Crystalline rocks are built up of a variety of minerals which are closely packed, and which have different coefficients of expansion, are differently orientated, and have different coefficients of expansion in different directions. Granite is a typical case. Although in its natural state this rock is extremely hard and can only be broken by means of a heavy blow with a hammer, yet, on exposure to temperatures within the range of building fires, it becomes so brittle that it can easily be powdered between the fingers. The disintegration is undoubtedly due to the peculiarities in the coefficients of expansion. Crystalline rocks should not be used

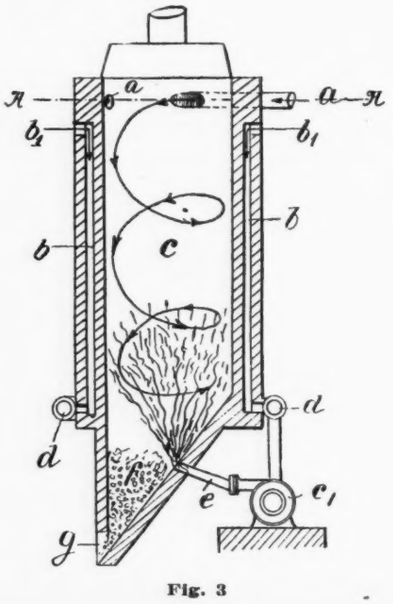


Fig. 3

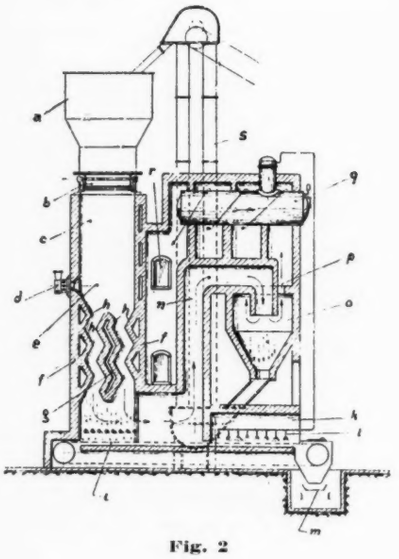


Fig. 2

for lintels, as they are certain to collapse. Limestones also lose so much of their strength as to be useless for fire-proofing purposes. However, sandstone under similar conditions while showing a change in volume and physical properties when the moisture content is changed, does not lose so much strength, and this loss would probably not be of considerable importance. It can be said in general that whether a burnt clay shows the moisture-expansion relationship, which results in loss of strength, depends upon the temperature of burning. The brick which has been heated to 1,100 degrees C. to 1,200 degrees C (probably the normal temperature of burning) is usually sufficiently vitreous to be free from this moisture-expansion and it is remarkably resistant to fire. Clay products including terra cotta are probably the best fire resisters. R. E. Stradling & F. L. Brady (Dept. Sci. & Ind. Res. Bldg. Res. Report No. 8, London).

Serious Fire in Stone Plant at Bluffton, Ohio

The main building of the National Lime & Stone Co. quarry at Bluffton, Ohio, was destroyed by fire September 19 with a loss estimated at $350,000. A hot box on the huge stone crusher or a short circuit in the electric wiring have caused the fire.

The fire caused 50 men employed at the plant to be idle until the building is reconstructed. The company about a year ago installed approximately $150,000 worth of new machinery.

LATEST NEWS FLASHES

Certain-teed Products Busy

This company is operating its cement plaster and wall-board mills to full capacity, with a daily production of approximately 1,500 tons. The mill at Agatite was closed down two years ago, immediately after its purchase by Certain-teed from the Beaver Products Corporation, and its reopening was delayed because of improvements which were made to the plant. The wall-board production will be still further increased, and the construction of an additional mill is under consideration. The company owns large gypsum rock deposits near Acme, Texas; and, although the mills have been in operation for many years, the available supply of material has barely been touched.

Keystone Company Objects to Dust

Keystone Portland Cement Company is to add new dust-collecting apparatus in its primary-crushing department at Bath, Pa. Norblo equipment, similar to that in the other departments, will be installed.

Bag Exchange Organized

Manufacturers and others who use quantities of burlap, bags, jute, hemp and sisal will be able to check the world market prices of these commodities, by reference to a single source—the New York Burlap & Jute Exchange, which will be opened for trading about October 1, at 80 Wall St., New York City.

The membership of the Exchange includes numerous foreign shippers, as well as importers, brokers, traders throughout the United States, assuring a broad market. With trading inaugurated on the Exchange, a manufacturer or user of any of these commodities who finds it desirable to cover his requirements or commitments for the following three or six months or perhaps longer, will be able to purchase options for such deliveries. When he has bought the actual materials, he can resell his options on the Exchange, so that, in the intervening period he has protection on price. The United States Government has given tacit recognition to Exchange trading, by agreeing to make loans on cotton and grain which have been hedged; and bankers throughout our country and abroad look with favor on the financing of purchases which have been properly hedged.

Aviation and Good Roads

A municipal airport conference is to be held in Washington, D. C., on October 24 and 25, to discuss eight subjects which are deemed of serious interest by the American Road Builders' Association and the Aeronautical Chamber of Commerce. Col. H. H. Blee, chief of the airports division, U. S. Department of Commerce, will preside, and papers will be presented by experienced men on these several subjects.

Charles M. Upham, secretary-director of the American Road Builders' Association, will act as toastmaster at the dinner, October 24, when Army and Navy executives will speak on non-technical phases of aviation.

Concrete Products Incorporated

Notice of incorporation of Concrete Products, Limited, of Regina, Sask., is contained in the current issue of the Canada Gazette. Authorized capital is 500 shares of preferred stock and 35,000 shares of no par value common stock.

Kaolin in Oregon

F. H. Brandenburg of Lake View, Ore., owns a deposit of high quality kaolin, in west Lake county, which he expects to develop in the near future.

Acetylene Men to Meet

Announcement has been made that the annual convention of the International Acetylene Association will be held at the Congress Hotel, Chicago, November 13, 14 and 15.

Hercules Plans Construction of New Experimental and Chemical Research Laboratories

Plans for the erection near Wilmington of a new experimental station consisting of experimental and chemical research laboratories were announced today by officials of the Hercules Powder Co., manufacturers of explosives, naval stores, nitrocellulose and cellulose.

Property consisting of about 300 acres is being acquired by the Hercules organization about 2½ miles west of Wilmington city limits. Following the erection of structures now being designed the experimental staff and research equipment will be moved here from Kenvil, New Jersey, the present site.

Construction will consist of a main building, containing chemical laboratories, offices and library, and auxiliary buildings housing experimental plants. A power house and store rooms will also be erected. At the present station about 120 people are employed of whom more than half are technically trained chemists, physicists, and engineers.

Removal of the Hercules experimental work to Wilmington will bring it into closer contact with the main office organization, facilitating the technical service the company offers users of explosives, cellulose, nitrocelluse, and naval stores (turpentine, rosin, pine oil). The Hercules company has carried on extensive experimental research work for a number of years.

Perforating Company Moves Into New Factory

Standard Stamping & Perforating Company has occupied its new factory at 3129 W. 49th Place, Chicago, Ill., where it announces a complete equipment of latest types of machinery.

American Pump Goes to Asia

One of the largest power pump units ever built by the Gardner-Denver Company, in its plant at Quincy, Ill., was shipped recently to an oil company in Asia. This unit includes two 7½-in. by 14-in. power booster slush-pumps, complete with a large power plant.

Rearrangement of the production machines in several departments of the Denver, Colo., plant of this company has been completed. Included in this new plan are the grouping of all machines which work on the same product, smooth flow of materials from the source of supply to the shipping department, as well as the elimination of waste, time and labor.

Conkey and Company Enlarging

H. D. Conkey & Company, manufacturers of the CONCO overhead traveling cranes and CONCO crawler cranes, is building an addition to the Mendota, Ill., plant which will make possible the doubling of its capacity. The addition is to be used for the fabrication of materials only, and will be equipped with the most modern tools for steel fabrication.

MANUFACTURERS' PUBLICATIONS

Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention PIT AND QUARRY *when making such requests.*

Adequacy

Measuring Value. 12 p. (Experience, No. 8, Sturtevant Engineers, Boston, Mass.) Emphasizes the advisability of considering the suitability of proposed equipment for attaining the objects for which it is to be applied.

Bins

Butler Bins and Hoppers for Sand and Gravel Plants. 12 p., 17 ill. (Bulletin 160, Butler Bin Co., Waukesha, Wis.) Describes and illustrates various examples of the use of steel bins by portable, semi-portable, and permanent plants, and different types of bin gates and weighing and measuring hoppers.

Butler Bulletin. 4 p., 60 ill. (Butler Bin Co., Waukesha, Wis.) Illustrates bins for sand and gravel, concrete products, central mixing plants, material yards, general contractors, and road construction, and special types for proportioning by weight and by volume.

Buying Trends

New Trends in Industry. 12 p., 1 ill. (Experience, No. 11. Sturtevant Engineers, Boston, Mass.) Discusses the changing demands of the buying public and their effect on products and manufacturing methods.

Coal Handling

"Barber-Greene Cuts Coal-Loading Costs." 2 p., 5 ill. (*Continental Red Seal*, Sept., 1929, Continental Motors Corp., Muskegon, Mich.) Describes the construction and economy of a Barber-Greene coal loader using a Continental engine.

Compressed-Air Tools

Reduce Overhead—Use Air. 16 p., 18 ill. (Gardner-Denver Co., Denver, Colo.) Describes and illustrates various types of portable air compressors (trailer, skid, truck, and railroad mountings), concrete breakers, clay diggers, drill sharpeners, drifting drills, etc.

Concrete

Monolith Mixer, Sept., 1929. 8 p., 8 ill. (Monolith Portland Cement Co., Los Angeles, Cal.; Monolith Portland Midwest Co., Denver, Colo.) Illustrates different uses of cement in building public markets, residences, stores, apartments, schools, and swimming pools.

Universal Dealer, Oct., 1929. 16 p., 17 ill. (Universal Portland Cement Co., Chicago.) Describes and illustrates various examples of concrete construction in the agricultural, material-handling and public-school fields.

Dredging

"W. D. Haden Company's New Hydraulic Pump Dredge." 1 p., 3 ill. (*The Amsco Bulletin*, American Manganese Steel Co., Chicago Heights, Ill.) Describes the dredge employed at the Haden company's West Point, Texas, plant.

"'Man Trolley' with 3½-Yard Clamshell Unloads Sand from 'Seagoing' Dredge." 4 p., 2 ill. (*The Crosby Clipper*, Aug.-Sept., 1929, American Hoist & Derrick Co., St. Paul, Minn.) Describes the "Gilbert" dredge operated by the Lake Sand Corporation.

Drills, Blast-Hole

Armstrong No. 29 Blast-Hole Drill for Mines and Quarries. 16 p., 21 ill. (Bulletin 98, Armstrong Mfg. Co., Waterloo, Iowa.) Describes a portable drill equipped with crawler treads.

Flexible Couplings

Flexible Couplings; Their Value and Many Advantages. 36 p., 20 ill. (Poole Engineering & Machine Co., Baltimore, Md.) Shows different applications of flexible couplings, and gives specifications of various types.

Labor Efficiency

How to Measure Labor Efficiency. 12 p., 1 ill. (Experience, No. 10, Sturtevant Engineers, Boston, Mass.) Discusses the advantages of judging labor efficiency by the kilowatt-man-hour standard.

Limestone Storage

"Economical Method of Storing Pulverized Limestone." 2 p., 2 ill. (*Sauerman News*, Sept., 1929. Sauerman Bros., Inc., Chicago.) Describes the handling of limestone dust by the use of a scraper outfit in storing and reclaiming for the Dubuque Stone Products Company.

Machinery, Rebuilt

Motors, Generators, Compressors, Etc. 60 p., 66 ill. (Bulletin 47, Rockford Power Machinery Co., Rockford, Ill.) Gives prices and specifications of new and rebuilt motors, generators, motor-generator sets, rotary converters, engine- and turbo-generator sets, engines, etc.

Merchandising

Advertising and Selling Versus Merchandising. 12 p., 1 ill. (Experience, No. 9, Sturtevant Engineers, Boston, Mass.) Points out that the secret of success in manufacture lies in knowing what the market requires and then making it.

Observation

Knowledge. 12 p., (Experience, No. 7, Sturtevant Engineers, Boston, Mass.) Gives examples of the value of observation as a means towards acquiring the knowledge necessary to obtain operating efficiency.

Pumps, Slurry

Morris Slurry and Sludge Pumps. 12 p., 17 ill. (Bulletin 135, Morris Machine Works, Baldwinsville, N. Y.) Describes and illustrates pumps for transferring slurry in cement mills and cutting sand in stone-cutting plants and shows several applications. The bulletin includes also a chart and tables of performance data and hints for attaining high operating economy.

Sand and Gravel

"Material Service Corporation of Chicago—Paul Ales Plant." 6 p., 11 ill. (*The Labor Saver*, Sept., 1929, Stephens-Adamson Mfg. Co., Aurora, Ill.) Describes and illustrates the methods and equipment used in handling, storing and reclaiming material.

Scrapers

"Elevated Bridle for Rapid Shifting and for Building High Piles." 1 p., 1 ill. (*Sauerman News*, Sept. 1929, Sauerman Bros., Inc., Chicago.) Describes and illustrates equipment for handling materials in long, high piles.

Screening

Screening the Bank. 4 p., 6 ill. (Folder 42 LVS, Barber-Greene Co., Aurora, Ill.) Describes and illustrates a new complete portable screening plant for sand and gravel.

Trucking

"Trucks That Thrive Where Others Wither." 1 p., 1 ill. (*The Mack Bulldog*, Vol. VII, No. 5, Mack Trucks, Inc., New York City.) Describes the use of trucks in hauling materials for building concrete tanks.

Welding

"Methods of Testing Welds." 7 p., 17 ill. (*Oxy-Acetylene Tips*, Oct., 1929, Linde Air Products Co., New York City.) Discusses available methods for determining the ability of welders and the quality of welded products.

Wire Cloth

Wire Cloth — All Meshes — All Weaves—All Lengths—All Widths—All Metals. 4 p., 32 ill. (Newark Wire Cloth Co., Newark, N. J.) Illustrates and describes various types of wire cloth, testing sieves, and special cloths for filter use.

NEW MACHINERY AND SUPPLIES

Robbins & Myers Announce New Chain Hoist

A differential chain hoist possessing three new and exclusive features of superiority is announced by Robbins & Myers, Inc., Springfield, Ohio. Timken thrust bearings used in the lower hook permit easy turning of the load in addition to reducing chain and upper sheave wheel wear caused by chain twisting. The sheaves are of Aremite, an alloyed iron produced in the Robbins & Myers foundry, which, because of a tensile strength twice that of ordinary gray iron and an unusual hardness, is remarkably durable. Aluminum finish is used throughout, chains excluded, and provides lasting protection against damage from exposure. The chains are of a special analysis steel, heat treated and electrically welded. This hoist is manufactured in five sizes, with capacities ranging from ¼ to 2 tons. Descriptive bulletins containing complete information are being distributed by the manufacturers.

Barber-Greene Company Designs New Screening Plant

By combining a Leahy Deister screen and a Barber-Greene model 42 bucket loader, with slight modifications of both, the Barber-Greene Company of Aurora, Ill., has developed an unique one-man excavating, loading, and screening plant. The plant is a complete unit—self-propelled, self-loading, self-contained.

The bucket loader has the standard B-G features; the automatic safety sprocket, which stops the bucket line when the bank caves too much, without hurting the machine or killing the engine; the full crawler mounting with three-point suspension; and the patented disc feed. The high-speed selective Leahy screen is an innovation in the Barber-Greene line.

When the bucket loader throws the gravel into the screen, it throws it first against a deflector which serves the purpose of breaking the impact of the discharge, and of spreading the material before it hits the primary screen.

The primary screen is a heavy, square-mesh screen inverted over the main screen like a roof and vibrated by a take-off arm from same drive that vibrates the main screen. This primary screen spreads the material again to insure better separation by the main screen below, and retains the oversize. The oversize material caught is rejected through two chutes, one on either side of the screen, onto the conveyor which runs beneath the main screen, and discharged at a point 8 ft. 2 in. from the center of the machine and 7 ft. 5 in. above the ground.

After the material has been shaken through the primary screen, it falls onto the main screen, a 4-ft. by 5-ft. fine-mesh screen, vibrated at 1,600 vibrations per min. by the bucket loader power unit. This screen is made with several mesh sizes. The one in the picture is ¼-in., and can be set at any angle from 28 deg. to 35 deg. by a lever within reach of the operator. The material selected by this screen is chuted off directly behind the loader into trucks, while the fines which fall through it drop onto the conveyor and are carried off with the oversize. In case sand is desired, a gate in the mouth of each of the oversize-spouts is flopped open, allowing the oversize rejected by the primary screen to fall direct to the ground instead of falling on the conveyor. Then, since the smaller gravel is thrown off by the main screen, and the oversize is dropped through the spouts to the ground, the conveyor carries nothing but clean sand to the truck on the side.

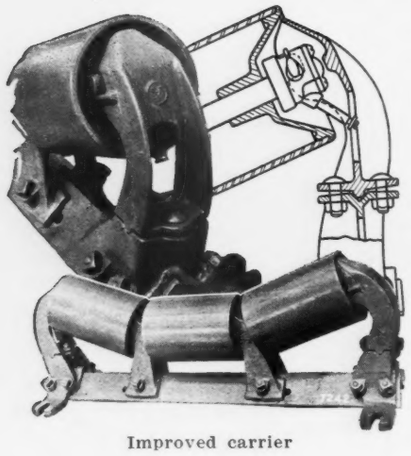
With the new Leahy Deister screen mounted on the heavy bucket loader, the Barber-Greene Company offers virtually the first self-contained excavating, loading, and thorough screening unit, which moves about under its own power, feeds itself, and is operated by only one man.

Stephens-Adamson Company Improves Sacon Carrier

The Stephens-Adamson Mfg. Co. of Aurora, Ill., recently announced an important improvement in their Sacon carrier for heavy-duty belt conveyors. This carrier was one of the first successful anti-friction carriers produced and was designed by S-A engineers to fill the need for a sturdy, rigid, free-running idler for permanent conveyors. Reports from different installations showed that the design was sound and that the decreased belt-pull made possible by Sacon carriers made longer conveyor units practicable.

The improvements recently developed are shown in the accompanying illustration and include: double Tim-

Combination screen and loader



Improved carrier

ken roller bearings for each self-aligning bearing, belt rollers with end castings to prevent collection of material and moisture, and a new hood-type end bracket to protect the outer bearings.

The successful live-shaft principle with bearings outside the roller ends has been retained and the self-aligning bearing housings have been redesigned so the Sacon carrier can now be furnished with either double Timken roller bearings, double ball bearings or single ball bearings where lighter loads are to be handled.

The carrier now features the following points: three-pulley design of great strength requiring the least possible power to start and to run; entire carrier tilted at the proper angle to train belt; closely spaced rollers, made of heavy 6-in. diameter steel tubing with self-cleaning malleable end castings; a live shaft turns with each roller, decreasing bearing wear to minimum; two bearings for each roller; self-aligning bearing housings are equipped for pressure gun lubrication; double Timken roller bearings in each bearing. Double or single ball bearings furnished where desired; hood-type end brackets support and protect the bearings; rollers are supported upon a structural steel angle—the strongest and most rigid mounting available.

New Grinder Introduced By Eagle Iron Works

Davis Brown, formerly chief engineer of the American Clay Machinery Co., has designed a new grinder that is being built by the Eagle Iron Works, Des Moines, Iowa. This machine has no screen plates nor scrapers, hence the power requirement is low as well as the up-keep. Capacity is influenced by the hardness and friability of the material, the size of the lumps, the moisture content, and the desired fineness of grinding. The gears are enclosed, run in oil, and are made of a semi-steel alloy that combines strength and hardness. The drive shaft, muller shafts and vertical shaft are turned from hammered-steel forgings. The muller trunnion is cold-rolled steel. Bands are rolled from high-carbon steel. Tires are cast from our own semi-steel mixture of wear resisting metals, tread plates and plows are chilled on wearing surfaces. All of which combined, produce a grinder that is economical to operate and maintain. The ratio of gearing and size of pulley have been worked out to permit of driving direct from a motor or line shaft by means of a belt drive and without the use of a counter shaft using either a long belt or one of the various short belt drives.

An Improved Arc Welder

The new, improved Lincoln Stable-Arc welders represent the latest and most modern type of electric arc welding equipment. They are products resulting from many years experience in the manufacture of *only* electric arc welders and motors. The Lincoln Electric Company, Cleveland, Ohio, was the first to produce a single operator variable-voltage arc welder for commercial use, also the first to manufacture a welder of all welded steel construction. These welders are built in several types, such as the portable truck type, stationary platform type, gasoline-engine driven type, and belt-driven type. They have ball bearings throughout. The motor and generator armatures being mounted on the same shaft, two bearings and a coupling are eliminated.

New Corporations

Dyersville Onyx & Marble Co., Mayer, Ariz. 20,000 shares n.p.v. J. R. Denkhoff, Dyersville, Iowa; E. D. Hogan, Cascade, Iowa; J. R. Wallis, Dubuque, Iowa.

Limestone Dust Corp., Pocahontas, Va. $50,000. O. Henry Harman, Pres., Tazewell, Va. To quarry limestone rock.

Charles R. Harman, Inc., Elkridge, Md. 250 shares pfd., $100 each; 250 shares com., $100 each. Charles R. Harman, George P. Harman, Philip Stanley Harman, Charles A. Rowles. To operate sand and gravel, pit and manufacture clay products.

Fort Dodge Limestone & Clay Products Co., Fort Dodge, Iowa. $100,000. J. H. Coughlin, L. W. Smith, C. D. Coughlin. To mine and crush limestone rock, to mine clays, and manufacture limestone and clay products.

Belle Chaney Sand & Gravel Co., Inc., Turkey Creek, La. $30,000. Jesse P. Barnett, Opelousas, La.; Albert Tate, Ville Platte, La.

American Manganese Fertilizer Co., South and Lee Sts., Alexandria, Va. Albert S. Dulin, Pres.; Malcom W. Morgan, V. P.; Frank R. Porter, Sec., Potomac Bank Bldg., Washington, D. C. To develop limestone and manganese deposits for manufacture of complete fertilizers.

Silver Lime & Stucco Co., Silverdale, Kans., and Arkansas City, Kans. Judge W. K. Moore, Pres., Ponca City, Okla.; J. W. Lemon, Sec.-Treas., Dearing, Kans.; C. C. Stallings, V. P. & Mgr., Silverdale, Kans.; and John S. Alcorn, Ponca City, Okla. To develop limestone deposits and manufacture lime and stucco. A. S. Deringer, Oakharbor, O., owner of Limestone Calcium Products Co., Limestone, Rocky Ridge P. O., Ohio, is selling his plant and will assume management of Silver Lime & Stucco Co.

Tennessee River Sand & Gravel Co., 431 S. 3rd St., Paducah, Ky. $50,000. F. W. Olcott, W. M. Olcott, Hardy Roberts.

Missouri-Kansas Gravel Corp., Ralph Gore, Sec.-Treas., Pittsburg, Kans. $75,000 pfd.; 4000 shares n.p.v. $75,000 to be used in Missouri. 105 N. Ball St., Webb City, Mo. Produce sand and gravel and crushed stone.

Freel Sand & Gravel Co., c/o W. L. O'Malley, 44 Curt St., New York.

Valley Gravel Co., I. C. Slooter, Mgr., Box 264, Benton Harbor, Mich. $35,000. Harry Huston, Fred Glupker, Dwight M. Ruth.

Allied Rock & Materials Co., c/o Earle M. Daniels, attorney, 1106 Spring Arcade Bldg., Los Angeles, Calif. $1,000,000.

Reach Granite Co., Rockland, Maine. $10,000. Ambrose, A. Peterson, Pres.; Ralph L. Brown, Treas.; Herbert W. Fifield and Andrew M. Gassie, directors; all of Vinalhaven, Maine.

Industrial Abrasives Corp., c/o Robert M. Davis, 630 Broadway, Gary, Ind. 2000 shares, $100 each. Frank T. Ryan, J. H. Jochum, Jr., Adolf N. Hult.

Silica Mfg. Co., Grove, Okla. $15,000. N. E. Hopkins, Paul U. Cooksey, Dow Phoenix.

Diatomite Products, Ltd., Huntsville, Ont., Can. 500,000 shares n.p.v. To develop diatomaceous earth.

Calvert-Baker Lime & Cement Co., Home Builders Bldg., Phoenix, Ariz. $30,000. F. W. Calvert, R. V. Baker.

Southern Sand & Gravel Co., 791 Poplar St., Memphis, Tenn. 500 shares n.p.v. N. A. Dye, J. W. Warpe. Pumping operation on Jones Ave., near Wolf River, Memphis.